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GENDER DYSPHORIA AND AUTISM SPECTRUM CONDITION: THE
DEVELOPMENT OF GENDER IDENTITY

Section A:

What is the empirical evidence for the biological theory of gender development using
participants with congenital adrenal hyperplasia?

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Section B:

An exploration into gender identity development in the presence of gender dysphoria and
autism spectrum condition

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A thesis submitted in partial fulfilment of the requirements of Canterbury Christ Church
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April 2019

SALOMONS CENTRE FOR APPLIED PSYCHOLOGY

CANTERBURY CHRIST CHURCH UNIVERSITY

Acknowledgements Page

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Summary of the Major Research Project Portfolio

Section A is a review of studies pertaining to the biological theory of gender development using participants diagnosed with congenital adrenal hyperplasia (CAH). The review found evidence suggesting females with CAH exhibited masculinised behaviour and personality traits, compared to unaffected controls. On critiquing the literature, there were numerous methodological flaws questioning the validity of these findings. Future research could focus on adding to the evidence base by agreeing a set protocol to investigate this phenomenon so findings can be replicated, increasing validity.

Section B presents a qualitative study exploring gender identity development in assigned males with gender dysphoria (GD) and autism spectrum condition (ASC). Eight young people were interviewed. Thematic analysis of the data identified seven main themes. Findings offered an understanding of how gender identity had developed within participants; through relating to stereotypical female interests and experiences of cis-male and females. Themes suggested participant's narrative of gender development saw it as being equated with biological sex, and isolation may drive their desire to transition genders. This study adds to a paucity of research investigating gender identity in those with ASC and GD, and has implications for future research and clinical practice.

Section C contains an appendix of supporting material.

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Major Research Project

Section A: Literature Review

What is the empirical evidence for the biological theory of gender development using participants with congenital adrenal hyperplasia?

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Abstract

The concept of gender has been brought into the limelight with the debate around gender neutral toys, parenting, and the rise of those wishing to transition genders. There is no one dominant accepted theory for the development of a gender identity; biological and psychological theories have both been offered. Biological theories have received significant attention as they purport to evidence gender differences are a result of prenatal hormone exposure. This review aimed to explore the literature on the biological theory pertaining to gender development using participants with congenital adrenal hyperplasia (CAH). CAH exposes foetuses to elevated levels of testosterone in the womb. It is argued biological and sociological influences can be disentangled by having people with CAH as participants. A systematic search of three electronic databases and relevant reference lists identified 16 papers. These papers were used to answer the question; what is the empirical evidence for the biological theory of gender development when females with CAH are the participants? The review found evidence to suggest females with CAH exhibited masculinised behaviour and personality traits compared to unaffected controls. However, on critiquing the literature, there were numerous methodological flaws that questioned the validity of these findings. Clinical implications include remaining curious about what influences gender development, and using the findings to support young people wishing to transition. The findings also challenge the potential law changes in the USA around the definition of gender. Future research should focus on how genetics are able to influence a social construction, and explore the argument that children are drawn to toys that possess certain characteristics, enhancing specific skills. Males with CAH should be investigated further, and methodologies should be more robust. Further research should explore social constructionist theories of gender identity.

Keywords: gender, gender identity, sex, development, theory.

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Introduction

Gender

The World Health Organisation (2018) defined gender, a definition accepted by the United Nations, as “the socially constructed characteristics of women and men – such as norms, roles and relationships of, and between groups of women and men” (para1). The difference between gender and sex is “sex is related to anatomical structure, gender is related to an imposed or adopted social and psychological condition” (Milton, 2002, p.321).

Gender Identity

The agreed definition of gender identity is; “a personal conception of oneself as male or female (or rarely, both, or neither)” (Ghosh, 2015, para 1). Gender identity can be displayed through clothes, gait and interests (Stonewall, 2015). It can be binary, where people identify as either male or female, or non-binary (gender queer); which is where one identifies as both male and female, or neither.

The Importance of Researching Gender

In the last decade there has been political movement aimed at placing gender at the forefront of the public’s mind. The Equality Act (2010) made it illegal to discriminate against people due to gender reassignment (Government Equalities Office, 2010). In June 2015, the House of Commons appointed a Women and Equalities Committee to monitor performance on gender equality, particularly around gender identity (House of Commons, 2017). At the 2021 Census topic consultation, gender identity was identified as an area with little data (Office for National Statistics, 2017). Hughes, Emel, Hanscom, and Zangeneh, (2016) found gender was under researched. This lack of data impacts on the government’s ability to inform policy and monitor service planning and resource allocation.

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Gendered toys have recently been criticised in the media (BBC News, 2018). It has been argued giving children gendered toys socialises them to the roles they are expected to inhabit, and the jobs they aspire to hold later in life. There is a 9.4% pay gap between the sexes, and McNeill (2017) argued socialisation in childhood contributes to this. Female children are often shown greater attention when distressed, and applauded for being 'nice'. Male children, conversely, are encouraged to be lively and independent (McNeill, 2017). Peck (2014) argued that such early encouragement to be 'nice' leads to adult females being fearful to request promotion and thus prevents them from achieving the top jobs.

Williams (1989) used 'gender neutral' as an alternative to defining objects according to gender categories (female/male). Raising a child as gender neutral has become an increasingly popular movement (Thomson, 2017), supported by celebrities and leading retail stores. John Lewis and Target were among the first stores to remove gender labels from their clothes and toys; they stated that they did not wish to reinforce gender stereotypes or to limit customers' choice of products (Thomson, 2017). A parent in Canada became a world first by fighting to raise their child without a prescribed gender (Foster, 2017). The parent argued that until the child is old enough to decide their own gender category, legal documentation should not identify their gender based on anatomy.

In 2016 Barack Obama, then president of the U.S.A., issued guidelines to public schools requiring them to allow transgender pupils to use the bathroom of the gender with which they identify (Trotta, 2017). This ruling was thrust back into the media when the current president, Donald Trump, revoked these guidelines (Trotta, 2017). Green, Benner and Pear (2018, Oct 21) reported the Trump administration were considering changing the legal definition of gender to one which states gender to be an immutable condition determined by genitalia at birth. Such a definition would suggest that gender is the same as biological sex.

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Harvey and Smedley (2015) identified a dramatic increase in the number of children wishing to transition genders, supported cross culturally (Marchiano, 2017). This increase has received widespread media attention, with many journalists wishing to investigate this phenomenon, and the contentious issues coupled with this, such as the age of transitioning and the medication given (Kirkland, 2019). With the issue of gender becoming ever more prominent, it is imperative greater clarity is sought as to how gender develops.

Rationale for Review

As identified above, there has been an increase in children wishing to transition genders, and subsequently an increase in the number of children receiving a diagnosis of gender dysphoria (GD). The NHS (2016, para 1) defined GD as “a condition where a person experiences discomfort or distress because there's a mismatch between their biological sex and gender identity”. The argument for the increase is two-fold; it may be this rise has resulted in greater media focus on other gender issues. Conversely, it could be argued the media focus on gender issues has resulted in the increase in GD. An argument for the onset of GD, is people are ‘trapped in the wrong body’ (Heylens et al., 2012). However, as Marchiano (2017) highlights, the scientific evidence that GD is a result of biology is simply not there. In order to understand how GD develops, we initially must understand how gender develops.

There is no dominant accepted theory for the development of gender, with biological and psychological standpoints both being seen as contenders, but neither being fully able to account for all the evidence presented (David, Grace & Ryan, 2004). Within the psychological theory of gender there are many factions. Cognitive theorists suggest gender develops in a stage-like process linked to a child’s developing brain (Owen-Blakemore, Berenbaum & Liben, 2009). Social cognitive theorists argue gender results from exposure to

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gender roles within society (Bussey & Bandura, 1999). Psychoanalytic theories suggest gender develops after identification with a parent (Richards & Barker, 2013). Feminists argue gender is a social construction that serves to oppress women, as males are seen as the more dominant sex (Butler, 1990).

The biological theory has many different strands, all arguing gender identity is predetermined; deriving from the influence of genes and sex hormones on the physical development of the genitals and the brain, subsequently impacting the type of stereotypically gendered behaviour demonstrated (Owen-Blakemore et al., 2009). Biological theories can be separated into three categories; the effect of prenatal hormone levels, the effect of chromosomes, and brain development.

Research into the biological theory focuses on the argument gender is caused by prenatal hormone exposure. There has been no previous meta-analyses or systematic reviews presenting this evidence within the last ten years. It is important the quality of the evidence pertaining to this theory is addressed if such a definitive statement is to be made.

This review aims to identify the evidence proposed for the biological theory of gender, using females with congenital adrenal hyperplasia (CAH). CAH is a genetic disorder that begins in the womb (Iijima, Arisaka, Minamoto & Arais, 2001), affecting hormone levels (too little cortisol is produced as well as an over-production of testosterone). It typically results in females being born with ambiguous genitalia. However, they are almost always assigned and reared as females (Pasterski, Hindmarsh, Geffner, Brook, Brain & Hines, 2007). Females will invariably be treated to regulate hormone levels, and surgically feminised during infancy (Pasterski et al., 2007). Males with CAH are usually not diagnosed until infancy as no symptoms of the disorder are present at birth. Diagnoses usually occurs with precocious puberty, or when difficulties with the lack of cortisol become apparent. Males

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with CAH may experience elevated testosterone levels initially, but then due to feedback, their levels readjust to normal or lower than normal (Mathews, Fane, Conway, Brook & Hines, 2009).

Early research into the biological theory of gender used rodents as subjects so hormone levels could be manipulated. As it is unethical to alter hormone levels in human babies, females with CAH provide a unique example. It is argued the effect of socialisation and biology can be disentangled as females with CAH have experienced elevated levels of male androgens (hormones) in the womb, but are socialised as females (Pasterski et al., 2007). Therefore experiments have been conducted with humans with CAH to evidence the effect prenatal hormones have on gender development.

This review will be looking at gender development in the first years of life. Steensma, Kreukels, de Vries and Cohen-Kettenis (2013) found gender identity development can also occur during adolescence, where young people begin to develop their own personal identity. A distinction was made between the two phases as gender development in childhood, and identity development in adolescence can be seen as two different phenomena (Steensma et al. 2013). This review will identify the available empirical studies and pose questions of the literature to analyse the quality of the evidence.

This review aimed to answer the following question:

What is the empirical evidence for the biological theory of gender development using participants with CAH?

Methodology

This narrative review employed a systematic search methodology to answer the following questions:

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- 1) What is the biological theory of gender development being examined?
- 2) What are the methods used to study this theory?
- 3) Does prenatal androgen exposure determine gender development?
- 4) What are the limitations within this research?

The review aimed to synthesise and critique literature investigating the biological theory of gender development using participants with CAH.

Literature Search

Systematic literature searches were conducted on 12th November 2018 and 15th February 2019 to identify relevant papers written in the English language and published since 1998 that tested the biological theory that prenatal hormones determine gender development. The date was chosen in order to identify current literature; 20 years was deemed appropriate for the contemporary generation of research in this area as methods investigating the phenomenon largely relied on animals prior to this. The search strategy is depicted in figure 1. The following electronic databases were searched: Medline, PsychINFO and Cochrane Library. The following search terms were combined: ('Gender' OR 'Sex') AND 'Congenital Adrenal Hyperplasia'. Additional relevant papers were identified from examining the reference lists of chosen articles, and searching Google Scholar. A total of 1471 papers was yielded from the literature before duplicates were removed. The titles and abstracts were scrutinized to see if the article was connected to the identified topic. If considered relevant, full text articles were obtained. Full-text articles were obtained for 50 papers, of which 16 met the inclusion criteria (in Table 1).

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Table 1

Inclusion and exclusion criteria of papers for the review

Inclusion Criteria	Exclusion Criteria
1) Testing the biological theory of gender development ^a 2) Empirical 3) Written in English 4) Published within the last 20 years, and used data collected within this time frame 5) Peer reviewed 6) Used humans as participants 7) Used participants below the age of 16 ^b 8) Used participants with congenital adrenal hyperplasia only (CAH) ^c 9) Must use controls that do not have CAH ^d	1) Not published 2) Not peer reviewed 3) Participants had autism spectrum condition (ASC), or study was testing for ASC traits 4) Participants had gender dysphoria 5) Related purely to research methods
^a The theory that prenatal androgens influence gender development. ^b The study needed to include participants below the age of 16 as the biological theory argues gender development is determined due to exposure occurring in the prenatal stage and evidence of this is expected to be seen in childhood. However, due to the rare nature of the CAH condition, participant pools often had a large age range (12-45 years) to increase sample size. ^c Studies that included participants with other disorders of sex development were not included. ^d This provides a comparison.	

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The search process is illustrated in figure 1, found below.

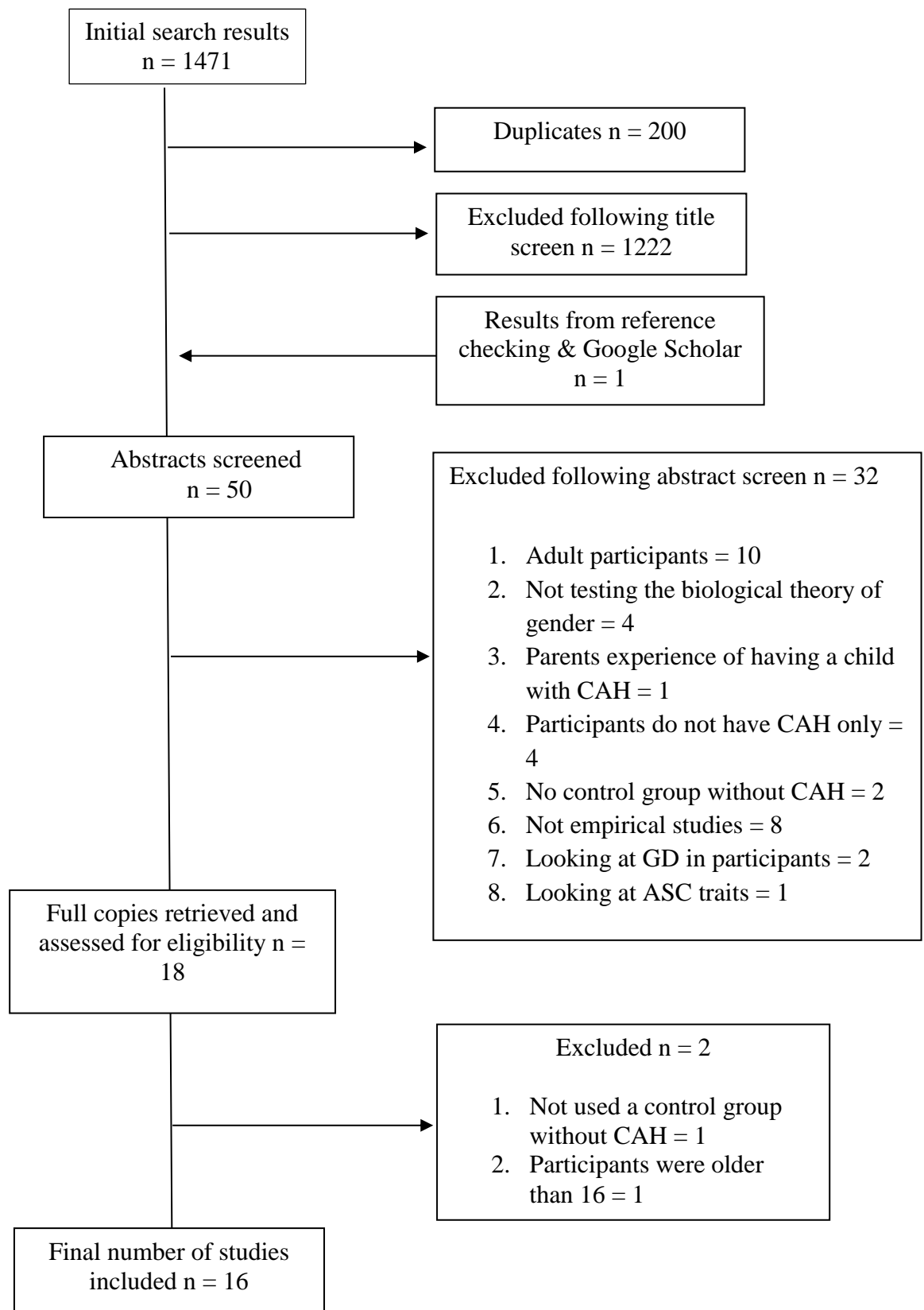


Figure 1. Prisma diagram depicting process of
literature search

Data Extraction and Analysis

The quality of the studies was reviewed using a data extraction tool (Appendix A) based on the following quality assessment tools; Critical Appraisal Skills Programme (CASP, 2018), Cochrane Handbook for Systematic Reviews of Interventions (Higgins & Green, 2011), The Joanna Briggs Institute Critical Appraisal Tool (Gagnier, Kienle, Altman, Moher, Sox, & Riley, 2013) and the Effective Public Health Practise Project (EPHPP, 1998). The extraction tools gave whole ratings for the articles. These ratings were not used, however, as Booth, Papaioannou and Sutton (2012) suggest that, due to their subjectivity, they can be misleading. As several tools were used in combination to analyse articles it is more helpful to regard the tools as a guide as opposed to a prescriptive method. The questions derived from the guides were placed into a spreadsheet and the papers were answered against those criteria, shown in Table 2.

Table 2.

Methodological appraisal of papers against data extraction tool

Author & country	Study Type	Recruitment	Participants	Sample Size	Blinding	Baseline Data	Outcomes	Statistics	Results
Berenbaum (1999) – United States of America	Cross-sectional	Does not give defined dates.	Sibling controls (not able to control for all extraneous variables), 82% Caucasian. Part of an ongoing study – this could question motivation or they could be fatigued. From endocrine clinics – difficult with generalisability and their	82 – does not say how to determine d. Relatively small sample size – difficult for generalisability.	N/a for researcher – does not say if p/pants knew research question.	None reported.	Questionnaire given directly to participants. Not a clear account of how questionnaire is given/who administered.	ANOVA – no drop-out rate reported.	Appropriate statistical analysis, only generalised to this group (CAH). Control group – extraneous variable. Questionnaire (responder bias).

			motivation for engagement . Does not discuss how participants recruited.						
Berenbaum & Bailey (2003) – United States of America	Cross- sectional	Does not give defined dates.	Tomboys (how identified – this is subjective), sisters and cousins. Part of an ongoing study – from an endocrine clinic. No discussion on how recruited from endocrine clinic, but tomboys was through newspaper. Discussed	79 – does not say how determine d.	Does not say if participant or researcher were blinded.	From the previous study they had medical informatio n.	Gender Identity Interview – modified measure, does not say who administered.	ANOVA – no drop out rate reported.	Appropriate statistical analysis, only generalised to this group (CAH). Control group – they do not exclude extraneous variables.

			characteristic between the group and how they did not differ.						
Collaer et al. (2009) – United Kingdom	Cross sectional	No dates given for recruitment.	Endocrine clinics – does not give specifics on how recruited. Families are controls.	128 – no power calculation given. Stated controls did not differ on IQ or age.	Does not say if researcher were blind, or if participants knew question.	They had medical data.	Grip strength, Targeting, Purdue Pegboard, Weschler Intelligence Test, height & weight (are these testing what they should be? Has priming been used here?)	ANCOVA – said why they did not do intention to treat analysis.	Appropriate statistical analysis, controlled for certain aspects and showed relationships to variables.
Collaer et al. (2016) – United Kingdom	Cross sectional	No dates given for recruitment	As above.	128 – same pool of participants as above – reduces variance.	Does not say if researcher were blind, or if participants knew question.	As above.	Spatial perception tests & quantitative tests	ANCOVA – as above.	Appropriate statistical analysis, controlled for certain aspects and showed relationships to
Hampson et al. (1998) – Canada	Cross sectional	No dates given for recruitment	Gives specifics on how they were	12 – no power calculation given.	Researchers were blind to the hypotheses	Medical data was reported.	Primary Mental Abilities Spatial	ANOVA	Confounding variables were accounted

			recruited but it was again part of a larger study (fatigue). Controls were siblings.	Very small size.	of the study – does not say if participants were.		Relations Test		for (age and IQ). All variables were reported and analysed separately.
Hines et al. (2003) – United Kingdom	Cross sectional	No dates were given for recruitment	Same pool as Collaer et al. (above).	128 – as before.	Does not say if researcher or participant blinded.	Medical data reported.	2 mental rotation tasks & 2 targeting tasks	ANOVA	Age and IQ controlled for. Statistical analysis reported.
Iijima et al. (2001) – Japan	Cross sectional	No dates for recruitment.	Was part of a study where they had done the drawing previously and then they re-analysed the drawings.	37 – no power calculation. Females with CAH and unaffected males and females.	Does not say if they were blinded to research question, or if researcher who rated the drawings were blinded.	No other information was given.	Free drawings	T-tests	Simple statistical analysis – no other variables able to be controlled for.
Leveroni & Berenbaum (1998) – United States of	Cross sectional	No dates for recruitment given.	Participants were already part of an ongoing	73 – no power calculation given.	Does not say if p/pants were blinded to research	Had medical data for cohort.	Validated questionnaire but to parents (response bias)	T-tests	Simple statistical data but did show how they

America			study.		hypotheses.				computed each individual part of the questionnaire.
Mathews et al. (2009) – United Kingdom	Cross-sectional	No dates for recruitment given.	Participants were already taking part in an ongoing study – Collaer et al.	128 – same as previous studies that have used this sample.	Does not say if participants were blinded.	Had medical data for cohort	Questionnaire directly to participant and a battery of tests (6 hours – participants could be fatigued	ANOVA	Appropriate statistical analysis conducted and all outcomes reported,
Merke et al. (2003) – United Kingdom	Cross sectional	No recruitment dates given.	Controls were just matched on sex and age. No information given on recruitment	74 – no power calculation given.	Does not say if researcher was blinded.	Completed IQ tests prior to MRI	MRI	ANOVA & Linear Regression	Appropriate statistical tests completed and all parts of the brain were correlated.
Meyer-Bahlburg et al. (2004) – United States of America	Cross sectional	No dates for recruitment given.	Recruited as part of an ongoing study. Controls were age and sex matched,	61 – no power calculation given or why they used that sample size.	Does not say if researcher was blinded, or the participants.	No data is given for baseline.	Play observation (played with parent present and not) & Gender Identity Interview. Play	T-tests	Simple statistical measure to compare the cohorts scores.

			some were siblings but most not.				observation is open to bias.		
Nordenström et al. (2002) – Sweden	Correlation	Dates of recruitment were given.	Discussed how they recruited and who opted in and declined. Controls were matched for age and sex.	80 – no sample size calculation given.	Researchers were blinded when rating. Does not say if participants knew of research question.	Severity of the disease.	Play observation (played with parent present and not) & mutation analysis	Spearman rank correlation coefficient	Appropriate analysis for correlation. All data reported.
Pasterski et al. (2005) – United States of America & United Kingdom	Cross sectional	No recruitment dates reported	Recruited from endocrine clinics but does not say how they did that. Controls were family. Had a wide range to increase sample size.	117 – no power calculation reported.	The observations were co-rated and the co-rater was blind. Does not say if parents were blinded to hypotheses.	No baseline data is reported (for IQ etc).	Play observation – detailed description of toys used, why and how they were configured.	ANCOVA	All parts of the analysis are reported and presented clearly.

Pasterski et al. (2007) – United States of America & United Kingdom	Cross sectional	No recruitment dates given.	Recruited from the same endocrine clinic as above but does not say it is the same participants and it is not the same gender make-up. Controls were related. Mainly Caucasian population – questions generalisability.	113 – no power calculation reported.	Unclear if parents knew purpose of research.	No baseline data is given.	Validated questionnaire but to parents (bias).	ANCOVA	All parts of the analysis clearly reported. Initially screened for group differences in age.
Servin et al. (2003) – Sweden	Cross sectional	Recruitment dates given.	Reported how they contacted people for recruitment. Control group was age matched.	52 – no power calculation reported.	States the observations were independently rated but does not say they were blinded.	Baseline data given for severity of illness.	Play observation (played with parent present and not), questionnaire to parents.	MANOVA and ANOVA	All analyses reported and discussed why they did not separate the analyses based on severity due

Spencer et al. (2017) - United Kingdom	Cross-sectional	Recruitment dates not given.	Part of a wider study – data not reported as stated it is published elsewhere. Control group were relatives.	153 – no power calculation given.	Does not say if participants knew of purpose of research.	States it is published elsewhere.	Revised version of a validated questionnaire (Compromise validity/response as to parents)	ANCOVA	to small sample size. Age was used as a control variable. Discussed how they could not make conclusions as the sample size was small and lacked generalisability.
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Of the 16 literature sources that met the inclusion criteria for the review, 15 were cross-sectional studies and one was a correlation.

Five studies investigated interest in gendered behaviour, toys and infants, five studies investigated visuomotor and visuospatial skills, three researched personality traits, two researched gender identity, and one studied brain structure. The papers are presented in Table 3 below with the data extracted.

Table 3.

Papers included & reviewed

Author & country	Design, methodology, analysis and outcomes	Sample	Main findings
Berenbaum (1999) – United States of America	<ul style="list-style-type: none"> - Cross-sectional - Activities questionnaire and occupational interests questionnaire - ANOVA 	42 males and females with CAH, 40 unaffected siblings.	- Girls with CAH showed increased interests in male typed activities and careers, and reduced interests in female activities and careers compared to controls.
Berenbaum & Bailey (2003) – United States of America	<ul style="list-style-type: none"> - Cross-sectional - Gender Identity Interview - ANOVA 	43 females with CAH, 29 unaffected relatives & 7 tomboys.	<ul style="list-style-type: none"> - Those with CAH did not develop male gender identities, despite over-exposure to male androgens. - Showed the development of gender identity cannot be solely down to exposure to hormones, it must be multi-faceted.
Collaer et al. (2009) – United Kingdom	<ul style="list-style-type: none"> - Cross sectional - Grip strength, Targeting, Purdue Pegboard, Weschler Intelligence Test, height & weight. - ANCOVA 	69 males and females with CAH, 59 unaffected relatives.	<ul style="list-style-type: none"> - Females with CAH were stronger and showed better targeting than female controls. - Males with CAH were weaker than male controls on grip strength but not targeting or pegboard measures.
Collaer et al. (2016) – United Kingdom	<ul style="list-style-type: none"> - Cross sectional - Spatial perception tests & quantitative tests - ANCOVA 	69 males and females with CAH, 59 unaffected relatives.	- Females with CAH did not perform more ‘male’ like on spatial perception or quantitative abilities than controls – they performed worse.

Hampson et al. (1998) – Canada	<ul style="list-style-type: none"> - Cross sectional - Primary Mental Abilities Spatial Relations Test - ANOVA 	12 males and females with CAH, 10 unaffected siblings.	<ul style="list-style-type: none"> - Females with CAH achieved higher spatial scores than female controls. - Males with CAH achieved lower spatial scores than male controls.
Hines et al. (2003) – United Kingdom	<ul style="list-style-type: none"> - Cross sectional - 2 mental rotation tasks & 2 targeting tasks - ANOVA 	69 males and females with CAH, 59 unaffected relatives.	<ul style="list-style-type: none"> - Females with CAH performed better on targeting tasks than female controls but not better on mental rotational tasks. - Males with CAH showed unaltered performance on targeting and impaired performance on mental rotation compared to controls.
Iijima et al. (2001) – Japan	<ul style="list-style-type: none"> - Cross sectional - Free drawings - T-tests 	8 females with CAH, 29 unaffected males and females.	<ul style="list-style-type: none"> - CAH females drew pictures with male characteristics.
Leveroni & Berenbaum (1998) – United States of America	<ul style="list-style-type: none"> - Cross sectional - Melson's Caring questionnaire - T-tests 	39 males and females with CAH, 34 unaffected relatives.	<ul style="list-style-type: none"> - Females with CAH had less interest in infants than female controls.
Mathews et al. (2009) – United Kingdom	<ul style="list-style-type: none"> - Cross-sectional - Personality Factor Inventory & Reinisch Aggression Inventory - ANOVA 	69 males and females with CAH, 59 unaffected relatives.	<ul style="list-style-type: none"> - Females with CAH were less tender minded than controls and reported greater physical aggression than female controls. - Males with CAH were less dominant, more tender minded and had reduced physical aggression than male controls.
Merke et al. (2003) – United Kingdom	<ul style="list-style-type: none"> - Cross sectional - MRI - ANOVA & Linear Regression 	27 males and females with CAH, 47 controls.	<ul style="list-style-type: none"> - Females with CAH did not have brains with male specific characteristics. - Both males and females with CAH showed decreased amygdala volume.

Meyer-Bahlburg et al. (2004) – United States of America	<ul style="list-style-type: none"> - Cross sectional - Play observation & Gender Identity Interview - T-tests 	15 females with CAH, 46 male and female controls.	<ul style="list-style-type: none"> - Females with CAH showed more masculine behaviour than female controls, but no differences in gender identity.
Nordenström et al. (2002) – Sweden	<ul style="list-style-type: none"> - Correlation - Play observation & mutation analysis - Spearman rank correlational co-efficient 	40 females with CAH, 40 female controls.	<ul style="list-style-type: none"> - Females with CAH played more with masculine toys than controls. - Dose response relationship between disease severity and degree of masculinisation of behaviour.
Pasterski et al. (2005) – United States of America & United Kingdom	<ul style="list-style-type: none"> - Cross sectional - Play observation - ANCOVA 	65 males and females with CAH, 52 unaffected siblings.	<ul style="list-style-type: none"> - Females with CAH chose more masculine toys than female controls. - Males with and without CAH did not differ on toy choice. - Females with CAH received more positive feedback from parents for making female toy choices than controls.
Pasterski et al. (2007) – United States of America & United Kingdom	<ul style="list-style-type: none"> - Cross sectional - Activity level/extraversion questionnaire - ANCOVA 	67 males and females with CAH, 46 unaffected siblings.	<ul style="list-style-type: none"> - Females with CAH showed more aggression than female controls. - Unaffected males showed more aggression than unaffected females. - Males with and without CAH show similar aggression and activity levels.
Servin et al. (2003) – Sweden	<ul style="list-style-type: none"> - Cross sectional - Play observation, question about peers, questionnaire on behaviour, interests and activities. 	26 females with CAH and 26 female controls.	<ul style="list-style-type: none"> - Females with CAH were more interested in masculine toys than controls and less interested in female toys. - Females with CAH reported more male playmates and an increased wish for

Spencer et al. (2017) - United Kingdom	<ul style="list-style-type: none">- Cross-sectional- Amniocentesis & Interests, Activity & Temperament questionnaire.- ANCOVA	81 females & males with CAH, 72 unaffected relatives.	<p>masculine careers compared to controls.</p> <ul style="list-style-type: none">- Girls with CAH scored higher on aggression variable than controls.
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Literature Review

In exploring the evidence for the biological theory of gender development, this review was structured by interrogating the literature. Distilling the evidence presented in the 16 papers, provided answers to the questions posed, and allowed for a summary of the state of the literature, within this field, to be given. Finally, the research and clinical implications arrived at, from this research, are detailed later in this paper.

What is the theory being examined?

All of the papers included in this review tested the essentialist theory of gender development pertaining to hormones. This theory states males and females exhibit differences in behaviour due to inherent, biological reasons (Rose & Rudolph, 2006). The particular argument in this review, articulated by Collaer, Brook, Conway, Hindmarsh, and Hines (2009), is exposure to sex steroids in sensitive periods of prenatal life contributes to gender development. Mathews et al. (2009) suggested it was particularly testosterone that permanently influenced behaviours to show gender differences.

Leveroni and Berenbaum (1998) suggested the presence of testosterone in the prenatal period has the effect of masculinising the brain; thereby facilitating the development of male-typical behaviour. This was initially evidenced with non-human mammalian species. Studies have shown behavioural sex differences in the play-mate preferences of rhesus monkeys (Meaney, 1998), and that females rats behave in a more male-like manner when given androgens (sex hormones) in the prenatal stage (Wallen, 1996).

Whilst all of the literature is concerned with the same overarching biological theory, the articles investigated varying phenomena related to this. Nordenström, Servin, Bohlin, Larsson and Wedell (2002), Pasterski, Geffner, Brain, Hindmarsh, Brook and Hines (2005) and Servin, Nordenström, Larsson and Bohlin (2003) investigated whether androgen

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exposure affected participant's choice of play toy. Pasterski et al. (2007) and Spencer et al. (2017) both researched the effect prenatal androgen exposure exerted on aggression and activity levels. Collaer et al. (2009) researched the effect androgen exposure had on visuomotor skills. Collaer, Hindmarsh, Pasterski, Fane and Hines (2016), Hampson, Rovet and Altmann (1998), and Hines et al. (2003) investigated whether prenatal androgens affected visuospatial skills. Iijima et al. (2001) researched drawing differences; they suggested this demonstrated spatial skills. Meyer-Bahlburg et al. (2004) and Berenbaum and Bailey (2003) investigated the effect prenatal androgen exposure had on gender identity. Leveroni and Berenbaum (1998) investigated the effect androgens had on maternal behaviour and Mathews et al. (2009) studied whether personality can be affected by androgen exposure. Merke et al. (2003) investigated if androgen exposure affected the development of the amygdala. Berenbaum (1999) researched sex-typed activities and participants interest in sex-typed occupations.

All of the studies claimed there are behaviours or skills that are considered more masculine, such as aggressive behaviour, choosing male typed toys, reduced maternal interest, and superior visuomotor and visuospatial skills. They suggest a predisposition to behaviours and skills such as these show prenatal androgen exposure causes gender development. The hypothesis in these studies was females with CAH will exhibit behaviour more typical of males due to their prenatal androgen exposure, despite being socialised as females. The hypotheses for the effect on males are varied, some suggesting they would exhibit male typical behaviours whilst other studies expected to see a decrease in male typical behaviour due to fluctuating hormone levels. The findings of the studies will be discussed further under the question posed regarding the outcomes.

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What methods have been used to study the biological theory of gender?

The methods used to investigate the effect of prenatal androgens include questionnaires, observation, experimental tasks, interviews and brain scans. Table 3 displays which methods were used, and by whom.

Table 4.

Study & methods used

Method	Study
Questionnaires	1) Berenbaum (1999) 2) Leveroni & Berenbaum (1998) 3) Spencer et al. (2017) 4) Pasterski et al. (2007) 5) Servin et al. (2003) 6) Meyer-Bahlburg et al. (2004) 7) Mathews et al. (2009)
Observation	1) Servin et al. (2003) 2) Nordenström et al. (2002) 3) Pasterski et al. (2005) 4) Meyer-Bahlburg et al. (2004)
Experimental tasks	1) Collaer et al. (2009) 2) Hines et al. (2003). 3) Hampson et al. (1998) 4) Collaer et al. (2016) 5) Iijima et al. (2001)
Interviews	1) Berenbaum and Bailey (2003) 2) Meyer-Bahlburg et al. (2004) 3) Servin et al. (2003)
Brain scans	1) Merke et al. (2003)

Seven studies administered questionnaires. Only two studies (Berenbaum, 1999 & Mathews et al., 2009) used a questionnaire directly posed to the participants; all others relied

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solely on parental questionnaires. Questionnaires asked about interests/engagement with gendered toys/activities, children's future career aspirations, the child's care of infants/pets, and their temperament.

Berenbaum (1999) used questionnaires to ask adolescents and their parents how frequently the adolescent engaged in sex typed activities (based on a scale of 'never', 'sometimes', 'often'), and asked adolescents whether they were interested (yes/no) in certain careers. Leveroni and Berenbaum (1998) used a previously validated questionnaire to ask parents the extent to which their children were involved in the care of infants, pets, younger siblings and the elderly. Parents were asked to rate on a frequency scale of 1 (never) to 5 (almost every day). Spencer et al. (2017) used the Interest, Activities and Temperament Questionnaire, which is a revised version of a previously validated questionnaire. The measure asked caregivers to rate how similar their child's behaviour was to that described (not at all like my child/a lot like my child). Pasterski et al. (2007) used the Activity Level/Extraversion Questionnaire, which is an unrevised version of that later used by Spencer et al. (2017). The questionnaire used by Servin et al. (2003) asked questions of parents about their child's interests and characteristics; a further questionnaire asked children about their desired career. Meyer-Bahlburg et al. (2004) administered two parent questionnaires, assessing children's toy choices and gendered behaviour, such as if they imitate female television characters. Mathews et al. (2009) asked parents about their child's interests, and participants completed questionnaires on tender mindedness, dominance, aggression, and interests in infants and pets.

Four studies used play observation. Nordenström et al. (2002) observed the child's play with 10 different toys, deemed masculine, feminine or neutral. Children played alone and with their parent present (which parent is not reported). Servin et al. (2003) used the

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same toy play observation set up as described above. Pasterski et al. (2005) used a similar play session but with different toys and differing time periods for solitary play and play with mother. Meyer-Bahlburg et al. (2004) employed play observations using gendered toys, and dress up props.

Three studies used interviews. Servin et al. (2003) posed questions to children about the sex of their best friend. Berenbaum and Bailey (2003) used a previously validated interview to assess for GD, which posed questions concerned with sex typicality, such as 'would you like to be a mother or a father?'. Meyer-Bahlburg et al. (2004) used a gender identity interview, similar to the one described above, to identify GD.

Merke et al. (2003) used Magnetic Resonance Imaging (MRI) scans to generate images of the brain in order to measure specific areas.

Five studies used experimental tasks. Two studies used tests of visuomotor skills. Collaer et al. (2009) used measures of grip strength, targeting and a Purdue Pegboard test. Hines et al. (2003) asked participants to perform a mental 2-D and 3-D rotational object test. They also asked participants to throw a ball and a dart at a target.

Three studies uses visuospatial tasks. Hampson et al. (1998) asked participants to complete a spatial relations test and a perceptual speed test. Collaer et al. (2016) used spatial perception tasks, such as asking participants to judge the angle of a line compared to 13 others, and quantitative tasks, such as arithmetic aptitude. Participants' short term memory was also tested. Iijima et al. (2001) explained drawing is a test of visuospatial skills. Participants in their study completed free drawings. These drawings were then analysed by Iijima et al. (2001), using previous research which suggested certain characteristics of drawings could be identified as more typically male or female.

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The majority of the studies employed questionnaires, and mostly asking the parents to report on their children. Only two studies used more than one method of analysis. With the exception of play observation, there was little consistency in the methods used. This is particularly relevant in the visuomotor and visuospatial skills: all used different tests and tasks.

What have the outcomes of these studies been?

The findings supported the theory that female foetuses exposed to elevated levels of testosterone in the prenatal stage will express a gender more in line with that expected of a male (increased spatial skills, interest in male toys, decreased maternal interest). However, the findings showed female gender identity was not affected by increased testosterone (their personal conception was they were female).

Nine of the 16 studies reported findings that directly support the biological theory of gender. They showed prenatal androgen exposure affected female participants with CAH's temperament, interests and behaviour; they were more in line with those expected of a male. However, the evidence of how testosterone affected males with CAH was varied; some studies showed they exhibited less male like behaviour (Hampson et al., 1998 & Mathews et al., 2009) and some found no difference (Pasterski et al., 2005 & Pasterski et al., 2007). Two studies had inconclusive evidence; some tasks showed a difference whilst others did not (Collaer et al., 2009 & Hines et al., 2002).

One study demonstrated that, on visuomotor tasks, females with CAH performed in a more 'male like' way (Collaer et al., 2009), and one showed this was the case for some tasks but not all (Hines et al., 2003). Collaer et al. (2016) evidenced no differences. Two studies showed females with CAH performed more male like than controls on visuospatial tasks (Hampson et al., 1998 & Iijima et al., 2001) and one evidenced this not to be the case

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(Collaer et al., 2016). The contradictory evidence in whether testosterone affects performance on these tasks makes it difficult to draw firm conclusions.

The two studies investigating gender identity showed it was not influenced by prenatal androgen exposure (Berenbaum & Bailey, 2003 & Meyer-Bahlburg et al., 2004). The one study exploring brain dimorphism showed no evidence of difference between males and females with CAH; however there were differences between participants with CAH and controls (Merke et al., 2003). Participants with CAH, independent of gender, showed smaller amygdala volumes compared to controls. Merke et al. (2003) argued females with CAH did not have brains with male specific characteristics (larger amygdala, smaller hippocampus), but both males and females with CAH showed decreased amygdala volume, which is linked to the processing of emotions.

Three of the studies showed females with CAH were more aggressive than controls; suggesting testosterone in the prenatal stage increases aggression, a trait suggested to be male. Mathews et al. (2009) evidenced females with CAH were less 'tender minded' and greater physical aggression was reported compared to the female controls. They also found males with CAH were less dominant, more tender minded and had reduced physical aggression than male controls. Pasterski et al. (2007) also showed females with CAH scored higher on aggression measures than controls. Spencer et al. (2017) supported these findings, evidencing females with CAH were more aggressive than female controls. They also found unaffected males were more aggressive than unaffected females; these findings supported their argument that aggression could be considered a 'male' trait or, perhaps, a trait linked to testosterone. Spencer et al. (2017) found males with CAH and male controls showed similar aggression and activity levels. The findings in all these studies, however, were based on results of questionnaires and so the potential for responder bias must be considered.

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Four of the studies showed females with CAH chose more stereotypical masculine toys than controls. Pasterski et al. (2005) evidenced the finding, but demonstrated males with CAH and male controls did not differ on toy choice. Servin et al. (2003) reported the finding of CAH females choosing stereotypical masculine toys, and also evidenced females with CAH reported more male playmates and a wish for 'masculine' careers compared to controls. Berenbaum (1999) showed girls with CAH had an amplified interest in male typed activities and careers, and less interest in female activities and careers compared to controls. Nordenström et al. (2002) supported the toy choice finding, and evidenced a dose response relationship between disease severity and the degree of masculinisation of behaviour. It should be noted, that none of these studies employed blind rating, which increased the risk of bias affecting the findings.

Similarly, Leveroni and Berenbaum (1998) used parental report questionnaires as evidence that females with CAH had less interest in infants than female controls.

Meyer-Bahlburg et al. (2004) and Berenbaum and Bailey (2003) both found that prenatal androgen exposure did not affect gender identity. Meyer-Bahlburg et al. (2004) showed females with CAH exhibited more masculine behaviour than female controls, but no differences in gender identity. At the same time, they did report the mean score for gender identity for girls with CAH was between the control group of females and 'tomboys'. Tomboys were defined as such by their parent. This conflicted with Berenbaum and Bailey's (2003) who found only five out of 43 females with CAH had scores outside the control group's range. Berenbaum and Bailey (2003) reported females with CAH did not develop male gender identities, despite over-exposure to male androgens. They argued this indicates the development of gender identity is multi-faceted and cannot be attributed solely to exposure to hormones.

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Two of the four studies into visuomotor/visuospatial skills found evidence that prenatal exposure to testosterone promotes male like performance on tasks necessitating these skills. The remaining two studies found contradictory evidence. Collaer et al. (2009) found females with CAH were stronger and showed better targeting than female controls, and males with CAH were weaker than male controls on grip strength but not targeting or pegboard measures. However, grip strength is not a usual test for motor skills. Collaer et al. (2009) supported Hampson et al. (1998)'s finding, evidencing females with CAH achieved higher spatial scores than female controls, and males with CAH achieved lower spatial scores than male controls. Iijima et al. (2001) showed females with CAH drew pictures with male characteristics; exhibiting superior visuospatial skills which they suggested is a male trait. They argued previous research had shown females tend to draw objects such as flowers, butterflies and the sun, whereas males prefer to draw vehicles, trains, aircrafts and rockets. They also claimed females are more likely to draw with an array of colour, particularly warm colours and to include humans in their pictures. In contrast, males use one colour and tend to use colder colours.

Conversely, Collaer et al. (2016) found females with CAH did not perform more 'male' like on spatial perception or quantitative abilities than controls, they performed worse than controls. Hines et al. (2003) showed females with CAH performed better on targeting tasks than female controls but no better on mental rotational tasks. Males with CAH showed no difference in performance on targeting, and poorer performance on mental rotation compared to controls.

What are the limitations in this research?

Control Groups. All of the studies used a control group as this was an inclusion criterion for the review. Five of the studies used controls matched on age and gender, but

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who were not related. The other 11 studies used siblings or cousins as controls. However, neither of these types of control groups could allow for full control over the numerous extraneous variables which could influence the findings. The age matched controls would inevitably have experienced different childhoods which could account for any of the findings; parents who promoted gender roles, greater exposure to mass media, play with toys that increase spatial skills, for example. The sibling controls were used to argue that these extraneous variables were accounted for by recruiting participants who had experienced the same parenting and upbringing. This was unlikely. Siblings could have had very different experiences; such as; how parents responded differently to siblings, varied experiences as a result of birth order (youngest/eldest/middle child), outside influences from school or social clubs, the impact of peers, media exposure.

One of the studies used 'tomboys' as a control. These were females identified as such by their parents. The word 'tomboy' is problematic as the concept is subjective, also the way in which the control group females expressed or displayed 'tomboy' characteristics could vary significantly between participants. Also, the participants who had been identified as 'tomboys' would presumably be wanting to exhibit a male gender identity as they had agreed to participate in a study where they knew they would be labelled 'tomboy', so may be more likely to try and adhere to male stereotype behaviour. Conversely, their 'tomboy' appearance and behaviour may be more of a wish to be non-gender conforming, rather than presenting as male.

The findings from participants with CAH cannot be attributed solely to over-exposure to androgens as other variables were unable to be controlled. Therefore, the use of controls in these type of studies provided no real contrast and subsequently added little to the research, as it offered no certainty that the difference between females with CAH and female controls

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was due purely to prenatal androgen exposure. Nevertheless, there appears no viable alternative to control the numerous extraneous variables when investigating this phenomenon. It has been suggested that twin studies could be used. Even so, twins still experience different upbringings and influences all of which could affect their gender development. Also, CAH is a rare disorder, and the concordance rate in twins varies between 10-90%, dependent on whether they are dizygotic or monozygotic (Hari Kumar & Modi, 2014), so it would prove difficult to recruit a cohort of twins affected.

Sample Size. The largest sample of participants with CAH was just 69, with the lowest number being eight. The average number of participants with CAH in the studies was 46. This means the studies may have lacked power, the likelihood of a false-positive result was increased, thus making generalisability difficult. However, it is challenging to recruit large sample sizes as CAH is a relatively rare condition (1 in 15000 live births, Hampson et al., 1998).

Participants. All of the participants in these studies evidencing the biological theory of gender had CAH. Therefore, all the findings could attest was those participants with CAH displayed different behaviours or skills compared to those without. The evidence did not show causality.

With this cohort of participants there were many factors that could also influence the outcomes. CAH is a serious medical condition often managed with steroids. There is a precarious balance in achieving the correct dosage, and an imbalance can lead to multiple health problems (Society for Endocrinology, 2019). The findings may have been a result of the steroids being administered. Having a life-long, serious illness could mean patients are more familiar with hospitals. Extended periods of hospitalisation may have impacted on the play experience and opportunities of those participants', such as playing with more spatial

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skilled toys, improving their abilities on such tasks. Hampson et al. (1998) argued this may have an impact on their abilities, but was unlikely to be the fundamental basis of it. Berenbaum (1999) argued females with CAH might have sought out more male typed behaviour, however they said this is initially influenced by the presence of elevated androgens.

Females with CAH may also have experienced virilised genitalia (masculine genitalia), meaning they themselves may have been confused by their gender; possibly they chose toys which they believe fitted with their own perception of their gender. Servin et al. (2003) argued their findings could not be attributed to the participants having a medical condition, as suggested above. They said previous research, conducted by Hall et al. (2001), had shown that people with diabetes did not exhibit masculinised behaviour. Ergo, it was not the nature of the chronic health condition that influenced their behaviour. However, these conditions have completely different manifestations, which would be likely to affect behaviour in different ways.

Females with CAH are also at risk of infertility. Whilst some of the younger participants may not have been aware of this, the older children may have had this explained to them during medical interventions, or have researched this themselves. An awareness of this could have significantly impacted on their interest in infants. Also, as Fine (2005) highlighted, interest in infants is by no means a predictor of maternal instinct.

People with CAH have a multitude of health issues; it is possible their emotional response to this could explain their higher levels of aggression than controls. It could also be argued that the participants' could be at risk of bullying and potential stigmatisation, should peers become aware of their health difficulties. Conversely, increased aggression was not seen in males with CAH as would be expected if the reasoning above was the case.

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However, the condition affects males and females in different ways and so that may have an effect on how it is managed emotionally.

With the exception of the Iijima et al. study (2001), which took place in Japan, all the studies were conducted in the USA, Canada or Europe. This means the findings can only be generalised to countries that have a high gross domestic product (GDP). These cultures are relatively similar in their social constructions of gender roles. If gender roles are biologically determined, it would be expected that the same results would be found in countries that do not adopt the same gender roles.

Merke et al. (2003) posited differences in the brain could also be attributed to trauma. Participants with CAH are likely to have experienced significant distress due to their illness, which could potentially have altered the size of their amygdala. It is also known that elevated cortisol levels can affect brain size. This could have occurred during hormone treatment.

Many of the studies recruited their participants through endocrine clinics. This could indicate the participants were quite unwell as a result of their disease and thus influenced the findings. However, it is also very probable that individuals with CAH would routinely be monitored in endocrine clinics and so this was the most viable way to recruit.

It is possible that the results were a consequence of their current health difficulties, rather than prenatal androgen exposure. All of the studies used purposive sampling which is non-random and therefore subject to researcher bias, so posing difficulties in generalising the results (Etikan, Musa, & Alkassim, 2016). However, other sampling methods would have not been adequate in obtaining the sample size needed.

It is also worth being mindful that four of the 16 studies (Collaer et al., 2009, Collaer et al., 2016, Hines et al., 2003 & Mathews et al., 2009) all used the same pool of participants

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for their studies. This could have led to increased effect sizes being reported as a possible result of practice effects, as the participants were tested on cognitive tasks. In addition, using the same pool of participants compromises validity and so could have led to reduced variance, and thus may have reduced the ability to generalise the findings.

Methodology. Most of the methods used in these studies were subject to methodological errors. Berenbaum and Bailey (2003) used an interview not validated for their current sample. Spencer et al. (2017) used a measure, which was revised from its validated version, and so brought the reliability and validity of their measures into question. This suggested what they reported to have tested may not have been the case. Leveroni and Berenbaum (1998) used a parental report method, which was open to subjectivity and potential responder bias. This could be particularly pertinent in this case as parents may see their child's gendered behaviour as a direct result of their parenting. However, Leveroni and Berenbaum (1998) said the measure was not subject to the usual criticisms directed at parental report questionnaires, such as parents reporting females with CAH to have more masculine behaviours, due to parents seeing their child as masculine. They cited other research which had shown parents of daughters with CAH do not see their child as masculine. However, it seems unlikely that any research would be able to explore unconscious biases that may be present.

Many of the studies used play observation as a method. In an attempt to reduce observer influence and so increase reliability, the sessions were videoed. However, none of the studies reported blind rating, which left the findings subject to bias.

Cognitive tasks were also used as a method of investigating the theory. However, Fine (2005) made the point that participants' performance could be significantly affected if the participants were primed before the test, for example, by being told the aim of the test

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was to show how male or female they were. Fine (2005) showed if males were primed to act less male before a test, their performance on the test decreased. In these tests, control females may have been primed to act in a more female manner than females with CAH due to their different life experiences. Also, Fine (2005) argued these tests do not account for why females and males perform differently. They offered no explanation for a biological mechanism that could lead elevated testosterone to affect certain skills.

There was very little homogeneity in the methods used in this literature. Whilst this could be seen as a strength of the research as the phenomenon was being investigated from several different angles, it also made it difficult to develop the findings and harder to replicate.

The methodology in these studies clearly had many flaws, however, no viable alternatives have yet been proposed by the critics.

Publications. Hines et al. (2003) acknowledged there were many discrepancies with results in this area of literature. This was evident when reading the studies in this review, all of which cited previous studies that found differing findings; sometimes differences between participants and controls were observed, but not always. Hines et al. (2003) suggested this could be due to only positive results being published, skewing the literature. Fine (2005) also argued there were studies in the research sphere that were not published, that evidenced females with CAH having personality characteristics more in line with females.

Discussion

Summary of Review Findings

This review aimed to explore the biological theory of gender by considering the validity of the methods used to test the theory, the findings of the studies and what the limitations in the research were.

In terms of the theory being explored, all of the literature was concerned with the essentialist theory of gender development. This argued males and females exhibit differences in behaviour due to inherent, biological reasons. The specific theory tested was prenatal exposure to androgens in the womb determines gender. All of the studies used participants with CAH, as they have been exposed to elevated levels of testosterone in the womb. Their behaviour was seen as a result of this exposure. Fourteen studies investigated gender development, and two studies investigated gender identity development.

In terms of the methods used to test this theory, they included questionnaires, observation, experimental tasks, interviews and brain scans. The most common methods were the use of questionnaires, and then either play observation, or cognitive tasks. These methods were subject to many flaws, such as the subjectivity of self-report measures, using revised versions of measures which can potentially compromise validity and reliability, the lack of blinding of researchers, and how practice affects could occur on cognitive tasks.

Over half of the studies included in this review showed direct support for the biological theory of gender. Five of the studies showed varying support for the theory; some positive findings, but also some outcomes that did not show the expected hypothesis. The two studies investigating gender identity evidenced it was not affected by prenatal androgen exposure.

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There were many limitations within the research. The control group was not without influence from extraneous variables, sample sizes were small, the different experiences participants with CAH would have from being unwell was not considered, numerous studies used the same participants, non-random sampling was employed, and studies were conducted in countries with similar gender roles. There was no accepted protocol of research for this phenomenon which limited the research conclusions, and the development of theory as researchers all employed different methods.

Overall, the findings from this review showed support for the biological theory of gender, but evidenced gender identity was not influenced by androgen exposure in the prenatal stage. However, when critiquing the validity of these studies, many limitations were found which questions how accurate the findings are, and whether they were evidencing what they purported to.

This review is also limited by its scope. The inclusion criteria meant only studies conducted in high GDP areas were included; some studies had been conducted in India but did not focus only on participants with CAH. All of the studies reviewed had set their purpose as evidencing the biological theory of gender. There may be many studies presenting evidence challenging the biological theory that are unpublished.

What are the Clinical Implications?

Over the past five years there has been a 240% increase in the number of referrals to gender identity clinics (GIC) (Torjesen, 2018). It has often been argued people are 'born in the wrong body' (Heylens et al., 2012). The literature presented above supported this notion; that gender is biologically determined. Conversely, the literature suggested gender identity is not influenced by prenatal androgen exposure. However, caution should be exercised with regard to this finding as only two studies researched gender identity. This finding, coupled

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with the critiques of the research, indicate that the ability to claim, with any confidence, that prenatal androgens determine gender, has not yet been reached. Therefore, it is imperative we continue to understand people's desire to transition gender from a curious standpoint, of not knowing what influences gender and gender identity development

GICS in the UK have been under scrutiny recently, receiving criticism for their practice, such as fast tracking individuals through the system, but also lengthy waiting times (Doward, 2019). The more that is understood about how gender develops, the better position these services will be in to support the young people accessing treatment.

The potential changes, which could occur in the USA (reported above), which would not allow people to legally identify with a gender that does not correlate with their sex, adds extra poignancy. The evidence from this review shows that there has been no conclusive evidence that gender is determined by prenatal androgens, and therefore laws that suggest that is the case need to be challenged.

Within psychology it is widely accepted that social challenges affect mental health. An example of this is equality; a sense of inferiority can impact mental wellbeing (Blatt, Quinlan, Pilkonis & Shea, 1995). If it is accepted that gender is pre-determined, with certain traits being more masculine or feminine, it is even more difficult to argue that the genders are equal. Fine (2005) argued neurosexism (using neuropsychology to attest gender differences) ensures males retain powerful positions in society and prevent females from achieving equality. Some psychologists believe psychology should be applied when campaigning for social change (Psychologists for Social Change, 2015). It could be considered that it is their duty to continue critiquing the essentialist arguments of gender, advocating change in the normativity of using masculine and feminine to describe people and objects, in order to challenge this inequality.

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What are the Research Implications?

The findings of this review suggested androgens in the prenatal stage affect gendered behaviour, however, more research is needed to explain how genetics is able to influence a social construction, such as gendered toys. Further research could explore the argument that children are drawn to toys that possess certain characteristics for example; children who are regularly offered toys promoting spatial skills, often considered 'male toys', will be more likely to choose toys that need these skills in an observational assessment (Fine, 2005).

Current literature on the effect increased androgen levels have on males reached varying conclusions. The present research suggests androgens masculinise people rather than feminise them; using more males in the studies might offer greater clarity around this argument.

Current research has been hindered by poor methods, such as self-report questionnaires and non-blinded raters. Methodologies that are more robust could assist in the validity of results. Although difficult, due to the rarity of the condition, larger, more diverse, samples could seek to find whether similar differences are found in cultures which do not ascribe the same gender roles.

More research into suggested alternative theories of gender development, such as gender being a social construction, is required. Currently, empirical studies in this area have been limited, as it does not lend itself to this method of investigation. However, qualitative studies that fit with the epistemology of this theory could be employed.

As the literature presented does not confirm the theory that gender identity is biologically determined, further research should investigate the factors which influence the development of gender identity, with the possibility of linking such research to the studies of

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different theories of gender, such as cognitive, social learning theory, or social constructionist, as suggested above.

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Major Research Project

Section B: Empirical Paper

An exploration into gender identity development in the presence of gender dysphoria and autism
spectrum condition

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CANTERBURY CHRIST CHURCH UNIVERSITY

Abstract

There is a paucity of research into how gender identity develops, particularly in those with gender dysphoria (GD) and autism spectrum condition (ASC). This study aimed to explore how gender identity develops in assigned males with GD and ASC. Thematic analysis was used to analyse data from eight interviews, alongside two tasks to provide triangulation. Seven main themes were identified: narrative, relational, paradoxical, experience, media, identity, and ASC. Findings suggested participants equate gender identity with biological sex, therefore it is not open to external influence. Isolation may drive their desire to transition genders, and the media was used to understand GD. Participants related to cismales and cisfemales through gender stereotypical interests, and it appeared their gender identity had been influenced by their experiences of cismales and cisfemales. Conversely, there appeared to be a paradox between participants' perception of females, and what it meant for them to be female. Participants identified ASC as having little effect on their gender identity development. ASC traits, such as cognitive rigidity and difficulties with social skills, may impact on participants' desire to transition genders. Recommendations include clinicians exploring people with ASC's expectations of transitioning genders, and their internalised rules of what it is to be male or female. Limitations included the participants all expressing interest in the study, potentially giving bias to the results. The study used a small sample as it was important to understand this phenomenon in-depth, however generalising the findings to others with ASC and GD should be met with caution.

Keywords: gender identity, gender dysphoria, autism spectrum condition, transgender.

Introduction

Gender is defined as the socially constructed features of men and women; the roles, norms, relationships of, and between these groups (World Health Organisation, 2018). Milton (2002, p.321) identified the difference between sex and gender: “sex is related to anatomical structure, gender is an imposed or adopted social and psychological condition”.

Gender Identity

Gender identity is the personal conception of oneself as male or female, or identification as both, or neither (Ghosh, 2015). Brinkman, Rabenstein, Rosén and Zimmerman (2012) separated theories of gender identity development into essentialist, developmental, and socialisation.

Essentialist theories. The essentialist argument defines gender identity as predetermined; deriving from the influence of genes and sex hormones on the physical development of the genitals and brain, impacting engagement in gendered behaviour (Owen-Blakemore, Berenbaum, & Liben, 2009). Evidence suggests prenatal hormones affect behaviours showing sex differences, such as spatial ability and aggression levels (Baron-Cohen, 2009). However, the social environment is interrelated, and it would be puerile to argue hormones solely affect gender identity development without further evidence (Owen-Blakemore et al., 2009).

Ruigrok et al. (2014) stated differences in the size of brain regions account for gendered behaviours. Owen-Blakemore et al. (2009), supported by Fine (2011), explained this evidence was questionable, as the brain is plastic. Feminist theorists oppose the essentialist standpoint, arguing it maintains suppression of women, portraying them as the weaker sex (Tosh, 2016).

Developmental theories. Developmental theories focus on knowledge children have about gender and stereotypes, and how this affects behaviour (Owen-Blakemore et al., 2009). Martin, Ruble and Szkrybalo (2002) developed gender schema theory. Children are initially viewed as active agents, internally motivated to construct the meaning of gender categories (Tobin et al., 2010). Belonging to a gender category, they grow into ‘gender detectives’, noticing information relating to gender (Martin & Ruble, 2004). When they understand gender categories, they are motivated to behave in gender appropriate ways (Stangor & Ruble, 1987). Finally, they show flexibility in their beliefs about gendered behaviours (Ruble, 1994).

Socialisation theories. Socialisation theorists focus on the role of interaction. Children receive messages about appropriate gendered behaviour, both verbally and from watching adults model gender roles (West & Zimmerman, 1987). Brinkman et al. (2012) devised a model of gender identity development, drawing upon Bussey and Bandura (1999)’s social learning theory. This suggested children acquired information about gender from their environment, decide whether to conform or challenge this stereotype, subsequently expressing a gender identity.

Gender Dysphoria

Gender identity largely develops congruently with individual’s assigned sex, termed cisgender. For some, gender identity does not match their assigned sex. Gender dysphoria (GD), introduced by Fisk (1973), is when a person experiences distress or discomfort due to this mismatch (NHS, 2016). The research on gender identity development in persons with GD is limited; Olson and Gülgöz (2017) reported only one laboratory study has been conducted on this population. Lenihan, Kanith and Dundas (2015) said this group is stigmatised and marginalised by society, making them invisible in the literature. The theories for GD are separated into essentialist and psychological.

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Essentialist theories. Evidence for biological factors in the development of gender identity is ever-expanding, suggesting prenatal hormones and brain development account for GD, similar to theories for gender development. There are sex differences in the brain, structurally and functionally, observed during specific developmental phases or across the lifespan. These differences are predominantly determined by hormone exposure in the perinatal stage, altering hormone response throughout life. Studies demonstrated parallels in brain structure of trans-females and assigned females (Zhou, Hofman, Gooren, & Swaab, 1995; Hare et al., 2009).

Research showed if a female foetus was exposed to elevated levels of testosterone in the womb, they were more likely to show a preference for stereotypical male activities, adopt male playmates and show increased aggressive behaviour (Auyeung et al., 2009; Pasterski et al., 2011).

Chung, de Vries and Swaab (2002) critiqued these theories; arguing brain differences between the sexes developed in adulthood, yet gender identity development happens in childhood.

Psychological theories. Psychological theories divide into two categories; attachment difficulties, or identity formation. Research has shown children with GD have co-morbid separation anxiety (Coates & Person, 1985), or would identify as having an insecure attachment (Zucker & Bradley, 1995). Due to this insecure attachment, males may over-identify with their mother and develop a female gender identity. However, there is little empirical evidence to support these claims, and Zucker's work has been widely criticised (Tannehill, 2016).

From a psychodynamic perspective, GD in males has been attributed to an unresolved oedipal complex, or an inability to disidentify with the mother (Tyson, 1982). Di Ceglie (1998) claimed if a female perceives their mother as weak, they may develop a male gender

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identity to survive. These theories have not been advanced; other psychology theorists have adopted the position of GD arising from multifactorial development (Murjan & Bouman, 2015).

GD is increasing in the UK (Lyons, 2016) with many referrals specifying individuals have co-morbidities. There has been an increase in the number of children diagnosed with autism spectrum condition (ASC) also presenting with GD. This statistic is cross-cultural having been confirmed in Holland, UK, Canada and Australia (VanderLaan, Leef, Wood, Hughes, & Zucker, 2015; de Vries, Noens, Cohen-Kettenis, van Bercelaer-Onnes, & Doreleijes, 2010; Pasterski, Gilligan, & Curtis, 2014).

Autism Spectrum Condition and Gender Dysphoria

ASC is a permanent, developmental disability affecting how one relates and communicates with others, and how they experience the world around them (National Autistic Society, 2016). McManus, Bebbington, Jenkins and Brugha (2016) identified rates of ASC in the male population as 1.5% (95.0% CI: 0.8% to 2.6%), and for women as 0.2% (95.0% CI: 0.1% to 0.6%).

de Vries et al. (2010) reported an incidence rate of 7.8% ASC in a gender identity clinic (GIC) in the Netherlands; significantly larger than the 0.6-1.0% incidence rate in the general population, supported by May, Pang, and Williams (2017) in Australia. The UK's leading GIC published an incidence rate of 10.0% (Bevan, 2017). There is a higher prevalence of females with ASC wishing to transition; previously males had been higher (Kaltiala-Heino, Sumia, Työläjärvä, & Lindberg, 2015). The research into this increase in individuals with ASC wishing to transition is emerging, but has only been on a larger scale since 2010 (Van Der Miesen, Hurley, & de Vries, 2016). Similar to theories of GD, this has resulted in two dominant positions; essentialist and psychological.

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Essentialist theories. Baron-Cohen (2009) argued the extreme male brain (enhanced ability to systemise and decreased empathy skills) resulting from exposure to prenatal testosterone, could result in ASC and GD. This theory can only explain the occurrence of ASC and GD in natal females (Bevan, 2017), so falls short in providing an adequate explanation when both genders are reporting GD.

Psychological theories. Psychological theories have taken numerous positions; perhaps an indicator of the lack of aetiological clarity in this area. Holt, Skagerberg and Dunsford (2014) suggested ASC traits were artificially inflated in those with GD. They argued the trans-community faced discrimination, therefore isolating themselves and failing to learn social skills; then incorrectly perceived as ASC. Parry (2016) argued ASC is often misdiagnosed due to other disorders possessing similar characteristics, like depression or anxiety. Shumer, Roberts, Reisner, Lyall and Austin (2015) claimed mothers with ASC lacked the skills to reinforce the assigned gender identity of their child, resulting in GD. The researchers admit their finding did not clarify causation, and this means all mothers with ASC should have a child with GD. A prominent argument for the increase in people with ASC wishing to transition is traits associated with ASC lead to GD, namely cognitive rigidity and special interests.

Jacobs, Rachlin, Erickson-Schroth and Janssen (2014) suggested GD occurred as people with ASC struggle to think flexibly about gender, termed cognitive rigidity. Flexibility in thinking allows people to dress as the opposite gender, or engage in opposite gendered behaviours, and usually remain cisgender (Coplan, 2016).

Tateno, Teo and Tateno (2015) suggested the pre-occupation with transitioning could be a special interest; an intense focus on a particular topic, supported by other studies (Jacobs

et al., 2014; Lemaire, Thomazeau, & Bonnet-Brilhault, 2014). The controversy within this argument is special interests can change over time (National Autistic Society, 2018).

There is a paucity of research around gender identity development in those with a diagnosis of GD or ASC, and no agreed theory on how gender identity develops. There are theories attempting to explain the comorbidity of GD and ASC, but without research, they cannot be advanced. With the incidence rate of GD rising (Cassidy, 2016) and the known statistic that GD is prevalent in those with an ASC diagnosis, it is imperative time is devoted to exploring the development of a gender identity within these populations.

Study Aims

This study sought to investigate gender identity development in assigned males with a diagnosis of ASC and GD. Assigned males were chosen as research was ongoing with assigned females. It aimed to provide qualitative information on what affected and influenced the development of gender identity, adding to limited literature surrounding the aetiology of GD in those with ASC.

Given the lack of contemporary theory and empirical research, a heuristic, inductive approach was warranted to identify future areas of more focussed research.

Method

Design

A non-experimental, phenomenological approach, with a cross sectional design was employed. Participants completed a semi-structured interview, and two concrete tasks.

Ethical considerations. Ethical approval was gained from The NHS Research Ethics Committee (Appendix B). Research governance approval was obtained from the relevant NHS Trust Research and Development Team (Appendix C).

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Gender identity development can be a sensitive topic. To minimise potential for offense, the European Professional Association for Transgender Health's (2017) language policy was consulted. Participants were asked how they would like to be addressed, and which pronouns they wished to be used.

Risk of harm and distress was monitored throughout interviews, and appropriate safeguarding employed. Participants were given support line numbers (Appendix D). If participants expressed thoughts of harm to themselves during the interview, a risk assessment was completed by the interviewer.

Participants

Inclusion criteria. Participants were recruited using purposive self-selected sampling, according to set inclusion criteria (Table 1).

Table 1.

Inclusion Criteria

Assigned males^a

A diagnosis of ASC^b

15-18 years of age^c

A diagnosis of GD

^a a similar study was being conducted in the GIC with assigned females.

^b research indicated there was a rise in people with ASC wishing to transition genders.

^c this was chosen as they would be developmentally able to retrospectively reflect on their gender development.

Thirteen young people expressed interest in participation. Four people declined participation on initial contact, and one did not meet the inclusion criteria (assigned female). Eight participants were interviewed, recruited from two clinic hubs (Table 2). This allowed for a textured understanding of the experience, but considered the small population for recruitment (Sandelowski, 1995).

Table 2.

Participant's demographic information (*all names are pseudonyms to protect confidentiality*).

Number	Pseudonym	Age (years)	Education	Age became aware of GD (years)	Hobbies	Age of ASC diagnosis (years)	Time in GIC (months)	Treatment
1	Suzie	18	Left school after GCSE's – working	13	Socialise, skate, iOS, music, gaming	7	14	No current medical treatment from GIC – referred to adult services
2	Delta	18	In specialist ASC school	12	Gaming, history	5	48	No medical treatment from GIC – referred to adult services
3	Naomi	17	At college	13	Gaming, modelling	4	60	No current medical treatment
4	Sophie	15	At school	12	Art, reading, dancing.	12	41	No current medical treatment
5	Dana	17	At college	13	Video games, build computers, watch TV.	7	24	Hormone blockers
6	Hattie	18	At university	13	Role playing, writing, gaming, reading.	11	60	Hormone blockers and oestrogen
7	Rachel	16	At high school	13	Politics, Law.	14	20	Hormone blockers
8	Maddie	16	At high school	12	Socialise, art, music, volleyball.	13	7	No current medical treatment

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Procedure

Recruitment. The researcher attended the GIC to present the study to clinicians and distribute flyers (Appendix E). Clinicians identified suitable participants and discussed participation with them. If they wished to participate, verbal consent was gained for them to be contacted by the researcher. The research was explained in an initial telephone contact between participant and researcher, and questions answered. The interview was arranged to occur, either in person, or via telephone.

Materials. An in-depth semi structured interview schedule was developed from consulting literature and discussion with the research team (Appendix F).

The schedule comprised of questions designed to elicit a chronological account of the participant's gender identity development, focusing on school, home and relationships with others. The interview contained questions around childhood, adolescence and the future. Each sub-section asked how they related to others, thoughts on what influenced their gender identity, and feelings about their sexuality. Final questions were posed about their ASC diagnosis and eliciting feedback on the interview process.

The information sheet (Appendix G), consent form (Appendix H) and interview schedule were presented at a GIC stakeholders group. Feedback was used to amend materials to ensure they were comprehensive and inoffensive.

Piloting the interview schedule upon individuals varying in age allowed for practice of the interview technique, and identified ambiguous questions.

Two tasks were embedded within the interview schedule designed to elicit quantitative data, strengthening findings. The social circles task (Appendix I) asked participants to identify individuals who they felt understood them and place them in varying

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distances away from themselves; represented by concentric circles. The second task (Appendix J) required participants to label on a neutral-gendered person areas of their body they liked and disliked. The tasks were chosen as friendships and puberty were thought to impact gender identity development (Katz, 1986).

Data generation. Interviews occurred within a private room in the GIC, or via telephone (participants chose the medium); one occurred at a GIC, and seven via telephone. Interviews lasted on average 61 minutes, ranging from 43 to 85 minutes, guided by participants' desire to discuss the topic.

For the GIC interview, the participant was welcomed into the room and introductions completed. For telephone interviews, participants were asked to be in a place where they could talk openly for up to 90 minutes. Participants were asked to attend the interview alone; both in person and via telephone.

Information was given about the purpose of the study and the participant's involvement, alongside reading the information sheet verbatim. The consent form was completed. For telephone interviews, this had been emailed and posted and they were asked to have this to hand during the interview, along with the two task exemplars. The participant was given an opportunity to ask questions. Demographics were obtained (age and education) and questions were posed about hobbies to build rapport. A genogram was drawn by the researcher to allow an insight into the participant's context (Appendix K). Participants were informed they could request a break at any time during the interview.

The social circles task was employed, then the interview schedule, followed by the second task. Via telephone, participants described their answers for the tasks using the exemplars as visual aids, and the researcher scribed.

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Participants were given space to debrief about their experience of the interview. A £10 Amazon voucher was emailed as gratitude for participation. Interviews were digitally recorded, transcribed and anonymised for analysis. Interviews took place over a seven month period and data were stored in line with ethical guideline and data protection.

Quality assurance. Numerous methods were employed to ensure qualitative validity. Two bracketing interviews (Tufford & Newman, 2010) were conducted prior and during interviewing to minimise pre-conceived assumptions biasing the research. Reflections on this process are in the abridged research diary (Appendix N). Piloting of the interview schedule aimed to ensure validity of the measure (see ‘Materials’).

Respondent validation (Torrance, 2012) was used throughout the interviews; summarising answers and requesting clarification to ensure responses were captured correctly.

Mays and Pope’s (2000) quality assurance guidelines suggested transparency, audit trails and reflexivity when evaluating data. By detailing a clear description of data collection and analysis, ‘transparency’ can occur and the process from data, through analysis, to conclusions can be audited. An annotated transcript is presented (Appendix L) and a table to show themes and quotes (Appendix M). A research diary was kept throughout (Appendix N), bringing into attention potential biases from assumptions and experiences.

Braun and Clarke’s (2006) established guidelines for conducting thematic analysis, giving six clear phases to follow were utilised. They suggest familiarising oneself with the data by re-reading the transcripts, and generating initial codes; identifying interesting areas of data that may develop into themes. The codes are then developed into themes, and the themes reviewed to ensure codes match. Similar themes are then clustered and named. The themes are then evidenced with examples.

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Yardley (2000) suggested using inter-coder agreement to strengthen analysis. Three transcripts were jointly analysed for comparison and to ensure themes were grounded in the data; discussions regarding definitions clarified themes.

Data collection. In depth semi-structured interviews were utilised, incorporating a critical incident technique (CIT) (Flanagan, 1954) to elicit chronological accounts of what participants perceived influenced their gender identity development. CIT examines concrete events that influenced a specific phenomenon. The researcher identified categories they thought encapsulated what may affect gender identity development, driven by the literature. These categories were family, activities, stereotypes, authority figures, media and counterculture. Fagot (1985) observed parents reinforcing activities based on cultural stereotypes. Dweck, Davidson, Nelson and Enna (1978) found teachers influenced gender identity development. Gauntlett (2002) argued it was unlikely gender identity would not be influenced by the media. If a CIT influencer was raised in an interview, it was probed by the researcher. CIT was also used in analysis.

Data analysis. Thematic analysis and CIT were employed on the data to triangulate and strengthen findings. The use of an inductive (thematic analysis) and a deductive (CIT) approach allowed for inclusion of theory around what influenced gender identity, but the development of new information from looking at an under-researched group. All interviews were transcribed verbatim.

Thematic analysis, using a semantic and inductive approach, with a constructionist epistemology was initially employed on the data. As it was inductive, it was important it was utilised first. Thematic analysis is a flexible method, and can be used when there is little theory to indicate what data may be elicited (Braun & Clark, 2006). Braun and Clark (2006) suggest familiarisation with the data by re-reading transcripts. Initial codes were applied to

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the data; identifying interesting areas and repeated patterns, noting on the side of the transcript. Codes were developed into themes. Similar themes were clustered and sub-themes and main themes emerged.

Transcripts were re-read, and the number of times participants identified one of the pre-determined CIT categories as influencing their gender identity development was noted. The different categories were compared for frequency (Table 3).

The social circles task data were averaged for the total number of people identified, number in each social circle, and person identified (Table 4). On the feelings towards their body task, it was noted which areas were liked or disliked (Table 5).

Results

This study aimed to explore the development of gender identity in assigned males with GD and ASC.

Data collected consisted of individual interviews, and two tasks; social circles, and feelings towards their body. Themes from the analysis of the interviews are presented, then CIT influencers, and finally the results of the tasks.

In order to ensure the quality of the findings was maintained to a high standard, quality assurance methods were employed, as detailed in the ‘Method’ section.

Interviews

Whilst development of a gender identity was unique to participants, seven main themes emerged, containing 12 sub-themes. An illustrative map of the themes was developed (Figure 1), and a table evidencing the themes with quotes (Appendix M). The themes are identified at a latent level; data has been interpreted by the researcher and synthesised into themes. The number of participants supporting each theme is evidenced.

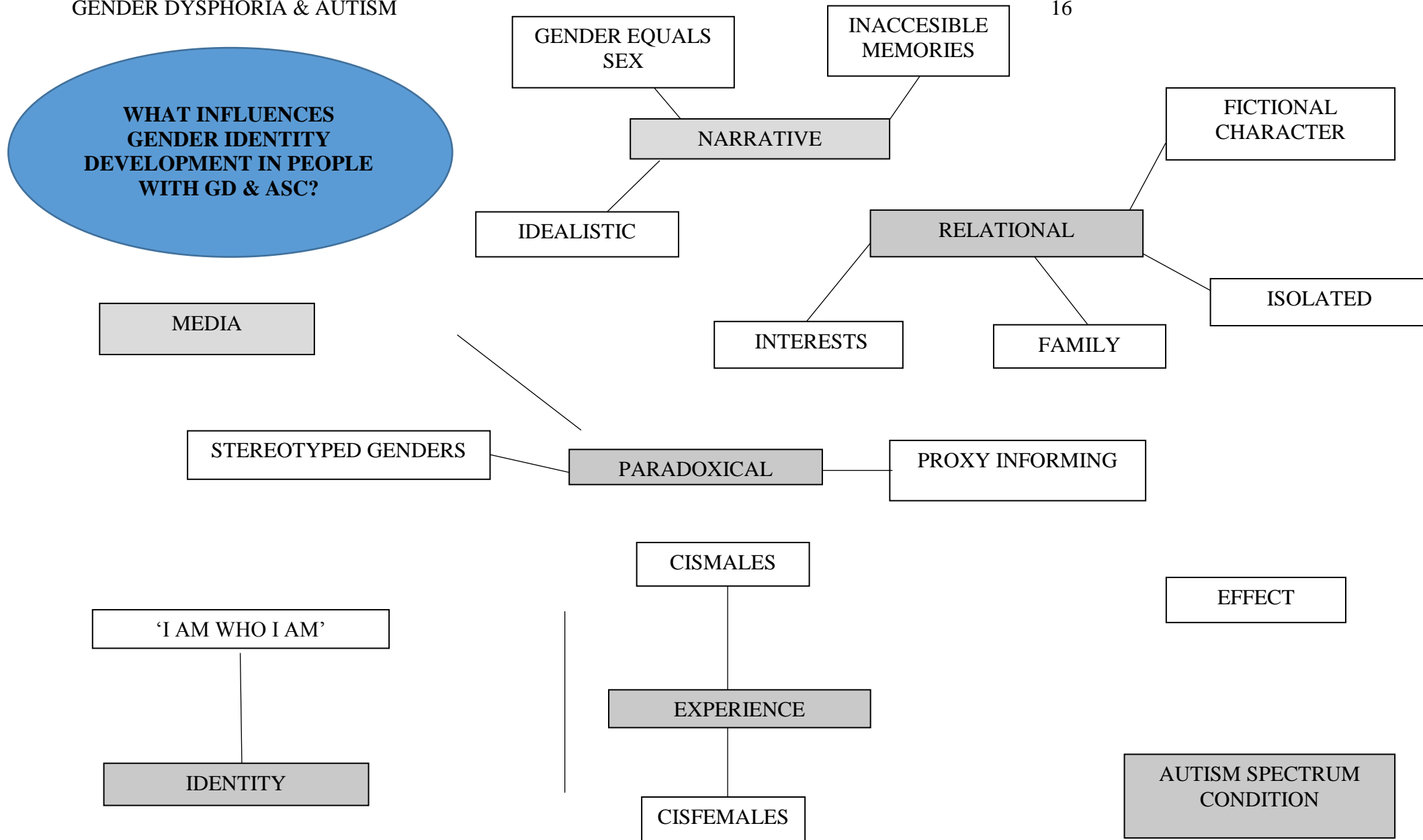


Figure 1. Thematic Map.

The themes are discussed below, incorporating the sub-themes. Each theme is evidenced with quotes from participants.

Narrative about gender development. This theme encapsulates how participants described what influenced their gender identity development.

Gender equals sex. Participants described their gender identity as internal, a feeling, rather than influenced externally. Seven participants identified with this theme. Most participants identified with the idea they had always been female, it had just taken an experience to highlight that to them. It seemed participants equated their biological sex with their gender; both being essentialist. Participants spoke of the uncomfortable feeling they had when inhabiting a male sex;

'It's just a feeling, it doesn't feel right' (Participant 2).

One participant articulated the feeling of discomfort;

'I felt really uncomfortable in my own body, the way I would try to imagine it, it was like, say if you had sand between your skin and the rest of your body, it was like uncomfortable and I felt really out of place in my own body almost' (P7).

Participants explained they understood the reason for wanting to transition as internal, again seemingly seeing gender as biologically determined;

'I don't think anything external influenced my identity, I think it is all internal' (P6).

This sub-theme refers to how participants came to the realisation they had a female gender identity. It seemed participants became aware of their dysphoria due to an internal feeling, not an external influence. One participant said it was because of situations where they acted in a female manner, and this highlighted to them their assigned gender was incompatible with how they felt internally;

‘I think like a woman and I do things in a feminine way’ (P3).

Inaccessible memories. Participant’s recollections of their behaviour in childhood was sparse. Seven participants evidenced this theme. Most participants could not recall clothes they wore, toys they played with, or how people treated them in relation to their gender. There are a multitude of reasons why these memories are inaccessible. Participants may have repressed memories of having a male gender identity; possibly due to how traumatic it must feel to be a sex that does not feel aligned with gender identity, or the anger they felt at not fitting in. Research suggests those with ASC have a diminished episodic memory (Bowler, Gaigg, & Lind, 2011). It may be participants cannot hold two opposing views; the memory of inhabiting a male sex, and now having a female gender identity. This links to a further theme of ‘paradoxical’.

‘There’s not a lot I can remember from those years’ (P1).

One participant explained they were so concerned with the lack of memories from their childhood they asked their parents about it;

'I actually went and asked my parents if I'd had a concussion or anything and they said no I hadn't so I am not really sure [why I cannot remember]' (P4).

Another participant identified they had actively avoided memories from their childhood due to the painful nature of having a gender that did not fit with how they felt;

'No not particularly, nothing specifically, but no, I sort of blocked out memories [of being male]' (P6).

Idealistic. This refers to participant's views of what it is to be female, and how their demeanour had changed since identifying as female. This theme was evidenced by six participants. Participant's spoke of females exhibiting more desirable personality traits and behaviour, and they had changed in line with this since adopting a female gender identity. On discussion of how it was holding a male gender identity, there were experiences participants discussed that seemed less desirable than their experience as a female. Participants spoke of feeling anger and aggression, but with the adoption of a female gender identity these traits had been replaced with more socially desirable ones.

'I am more openly empathic now which my friends have commented on' (P4).

'Yeah I am a lot more mellow now, I am nowhere near, I was a very destructive kid at times and nowhere near that level anymore...I'd say that's the main big thing that's changed' (P6).

Participants then spoke of females in quite idealistic language;

'I felt more of a connection with girls as when you go out in the area they are just nicer' (P1).

'I used to go out into the playground and I would get on a lot better with the girls as they were nicer and would play with you and speak with you and make daisy chains' (P4).

Relational. This refers to participants identifying their gender development had been influenced by their relationships; to people and to interests.

Interests. Some participants suggested their gender identity development had been influenced by certain interests. This was evidenced by three participants. They spoke of relating to the genders through gender stereotypical toys and clothes.

'I started dressing in more female clothes and wearing make-up, and I felt prettier and really liked it' (P1).

A participant was asked how she related to cismales, and females when she was holding a male gender identity;

'P: Erm, I used to like toy cars and dinosaurs.

I: And how did you relate to assigned females at that time?

P: I used to love dolls and wearing princess dresses' (P2).

Fictional characters. This refers to participants saying their gender identity had been influenced from relating to a fictional character, in a play or on the television. This was evidenced by five participants.

'I loved NAME OF CARTOON/PARTICIPANT so much and that's how my identity started to develop' (P1).

Isolated. Participants explained they had struggled with social relationships, and many experienced bullying. Seven participants evidenced this. Many participants spoke of finding interaction difficult and preferred to be alone. Two participants had been home schooled.

Participants were asked if they had friends;

'Not really as I have never been good at socialising with people' (P5).

'I'd say it's always been difficult with both [males and females]. Talking to people is difficult' (P5).

Participants spoke of how they had been subjected to bullying;

'I was teased a bit' (P2).

'I mean, I didn't really make many friends, or speak to many people in general from what I can remember. Even back then I was bullied, kind of badly bullied' (P3).

One of the participants suggested their ASC diagnosis may have impacted on their ability to make friends, and relate to people at school;

'...but a lot of struggles with friend groups, I always felt a bit left out, I would kind of be there but not really be with them, so there was always that because I wouldn't understand a lot of what was going on, the understanding of people' (P7).

Family. This refers to how participants felt they related to their family, and how mostly that relationship appeared to be strong. Five participants evidenced this. Participants equally identified their closest parent as being both mother and father. Three participants said they had experimented with their mother's clothes or makeup, but none identified their parents as having influenced their gender identity developing.

Asked how the relationship was with family;

'I am very close [to my family]' (P6).

Asked how the relationship was with their parents;

'We have quite a close relationship as I am an only child' (P4).

One participant had experienced their father leaving the family home, and another had their father working away when they were younger. One participant had been raised by their grandparents, but still had contact with their mother.

Paradoxical. This refers to participants speaking about identifying as a female, and informing people they wished to identify and be treated as a female. It seemed participants held two opposing narratives about these ideas. Participants expressed a particular viewpoint, but their actions did not match the viewpoint, suggesting a paradox between their beliefs and behaviours. None of the participants who expressed this theme, seemed aware of this polarity in their views, or commented on it.

Stereotypes. A theme that arose when participants were talking about what it meant to be a female. It appeared participants understood females and males can exhibit different gender roles, and they are not bound by societal norms. Conversely, when they spoke about why they wished to transition, they often identified being female was related to stereotypical activities, such as shopping, or make-up. It seemed participant's behaviour was driven by external rules dictating what behaviours each gender should engage in. Participants did not appear to have insight into this dichotomy of their narrative. Five participants evidenced this theme. This sub-theme also relates to the 'media' theme as most ideas about gender stereotypes are conveyed through mass media.

'I like shopping for clothes and I think I have always liked that' (P1).

A participant was asked what it means to wear make-up;

'P: It's something females do.'

I: Is it something only females can do?

P: Oh no anyone can' (P2).

Participants then spoke of how you could express your gender outside of the norms;

'You don't have to follow what each and every female does in society, it's how you want to present yourself' (P4).

Yet they still spoke of wanting to be stereotypically female in other answers.

Proxy informing. This theme arose from participants describing how they often asked others to inform their parents or teacher about transitioning because they were presumably fearing a negative reaction, yet when asked how people reacted, it appeared there was no hostility and everyone was accepting. Four participants evidenced this theme. There may be some avoidance, or denial in thinking about the possible negative ways people have reacted or may react. It could also be ASC prevents participants from correctly reading social cues; maybe they interpret reactions as positive even when negative.

‘P: I found it very nerve wracking, terrifying, I was so, I remember how anxious I felt one day trying to tell them, but I couldn’t tell them, I had to get some girls to tell my parents because of how anxious I felt about it.

I: And how did they react?

P: Oh yeah I knew they would be fine with it, I don’t even know why I panicked’ (P5).

Media. This theme relates to how participants learnt about transgender and GD, and how the media influenced their female gender identity developing. It encompasses social media, gaming websites, forums, and informative websites, such as NHS choices. This was evidenced by six participants. Most participants said they had a feeling they did not fit in, and something did not feel right. They used social media as way of exploring this feeling and found discussions about transgender.

'I think the only thing influenced, is how soon I got here, if I was to say one thing that has got me here at this point, it would be social media' (P7).

One participant mentioned the importance of highlighting it was not the media that influenced their gender identity changing; it was used as a medium to find information once the feelings of being uncomfortable in their current gender had occurred. They expressed their concern at people potentially thinking they had jumped on a 'bandwagon';

'I am always quite concerned to say that [social media influenced] as I don't want people to think oh they just saw it on social media and thought it was trendy ... but it was an element of discovering it as an option, not being forced into it, not being encouraged, it was an element of just, ... it took the social media to lead me there' (P7).

Identity. It appeared important to participants that despite their gender identity changing, they themselves had not changed. This was evidenced by four participants. Participants explained family and friends might be opposed to gender transitioning as they think they will lose their son/friend. However, they described the person and their personality as unchanged; it was just their gender altering.

'Being trans nothing inside you changes, you are still the exact same person, the only thing that changes is your physical appearance... that's all that really changes' (P1).

Experience. This refers to gender identity appearing to be influenced by the experience participants had of others.

Cismales. Participant's gender identity appeared to have been influenced by their experience of cismales, and their experience of themselves when they held a male gender identity. The participant's experience of cismales appeared less desirable than females, evidenced by four participants;

'The people who used to tease me were boys' (P2).

'The male teachers were rather brutal, and if you were loud they would restrain you and take you to an isolation unit' (P1).

Participants spoke of how they had been violent, aggressive and unfriendly when they held a male gender identity. This was evidenced by five participants;

'As I've already said, I was quite violent when I was younger' (P5).

Participants offered no explanation on the impact viewing cismales in this manner had on their gender identity development. In contrast, their experience of **Cisfemales** was them seemingly exhibiting more desirable behaviours, but participants did not identify how this experience may have impacted their gender identity. This was evidenced by four participants.

'The women understood you a lot more, they were so kind, and understanding and more empathic towards the students' (P1).

One participant highlighted their experience of their female friendship group influenced their gender identity developing;

‘...as you know, it’s boys versus girls at that age, you know the childish element of it. So I think friendship groups would probably be the biggest influencer’ (P7).

They explained when younger it felt you were either in the female friendship groups, or the male groups, there were no mixed groups. They said they had always felt more comfortable with females as friends, and being around females had highlighted their own female gender identity.

This links to the idealistic theme reported above. Participant’s experience of cisfemales was they were friendly, nice, and they spoke to them in school when others did not. This theme seemed to relate to participants struggling to socialise with others, and cisfemales appearing to be easier for them to converse, or play with. Participants appeared to describe themselves when holding a male gender identity as aggressive, yet now they held a female gender identity, those behaviours had disappeared. Participants did not highlight whether they were aggressive in nature as they felt peer pressured to act in a stereotypical manner, or whether it was frustration at holding a gender identity incongruent with their sex.

Autism Spectrum Condition

Effect. This relates to participants discussion of the impact of their ASC diagnosis, and whether they perceived it influenced their gender identity developing. Four participants suggested it had not affected, however, they acknowledged they could not be certain as they had not lived without ASC.

'I don't think it has impacted that much but I don't know as I have essentially lived my whole life with a diagnosis of it so I can't really speculate' (P5).

Two participants identified it had not impacted their gender identity, but having a diagnosis had helped and hindered them;

'A diagnosis is very useful as it's a slip of paper that you can show people to show them that you are not making it up. I used to have a lot of experiences where I would say I can't do that and they would say yes you can you are just being lazy, and now I can say well I can't do this, look at my piece of paper, it says so' (P4).

Two participants said it had impacted on gender identity development. One participant said it was in both a positive and a negative way. They said they did not let people's views of transgender affect them, but they had been left out in childhood friendship groups;

'...it helped me with things, I think in terms of what people think of me about gender identity, I think it helped as I don't really care what people think of me, but a lot of struggles with friend groups, I always felt a bit left out' (P7).

A different participant said they thought ASC had affected their gender identity development as they see a trait of the condition as a desire to not conform to society's norms;

'I guess something about ASD, this, this notion of non-conformity, so I guess the fact that I am trans, I guess that kind of influences that point in the way that I haven't conformed' (P8).

Critical Incident Technique

During the interviews, CIT was employed. If participants identified their gender identity development had been influenced by set categories, it was probed. Table 3 shows how many participants identified the categories as influencing their gender identity development.

Table 3.

The frequency with which the critical incidents were identified as influencers

Critical Incident	Frequency
Family	1
Activities	5
Stereotypes	6
Authority Figures	2
Media	7
Counterculture	3

This showed the most common influencers were stereotypes and the media, with the third being activities. These three seem to link together. Participants said their gender identity was influenced by relating more to female activities, portrayed as activities for females by the media; effectively stereotypes. Counter culture (this is a sub-culture whose values and norms differ from mainstream society) was identified by those who said online gaming allowed them the opportunity to understand their feelings of GD; meeting online with others who were experiencing similar feelings. It was also used when one participant said their gender identity

had been influenced by their desire not to conform to societal norms. Family and authority figures were in the minority, with one participant suggesting their uncle being homosexual helped them to find the courage to inform their parents they were transgender. Another participant suggested their gender identity may have been influenced by only having female teachers at nursery and school. These results link to the themes developed from the interviews that identified gender identity was influenced by relating to stereotypical female activities, and media use.

Tasks

Two concrete tasks were employed in the interview; one at the beginning and one at the end.

Social circles task. Participants were asked to identify who they considered close to themselves, displayed in Table 4. This showed on average participants had eight people in their social circles, ranging from 16 to six. The average number was three people for the two closest circles, and two for the outer circle. Participants identified more friends in the circles than family as a whole. There was no consistency in where family members, specifically parents, were placed in the circles and people identified friends as males, females, both transgender and not. Six of eight participants identified friends in the social circles who they had met online through gaming sites or social media. Two participants identified a partner in their social circles; one partner identified as transgender, the other as cisgender. The theme of isolation identified in the interviews triangulates with the data above; eight people in a social circle including family is

low. The average amount identified from other research was between nine and 12 for this age group (Lippold & Burns, 2009). Also the theme of ‘paradox’ may be present here for family. The theme of relating to family developed from the interviews, however in this task only three people identified family members in their social circle. However, this may be due to them perceiving the social circles as primarily referring to friends. Also, participants suggested they were close to their family, but they spoke of relating more to one parent, or neither, based on similar interests.

Table 4.

Average number of people placed in each circle by participant

Categories	Average Number
Total people in the circle	8
Total in circle 1	3
Total in circle 2	3
Total in circle 3	2
Total friends	5
Total family	3
Total associates	0

Feelings on body task. Participants were asked to mark on a body areas they liked and disliked in themselves. Table 5 shows the results of this task. The area most participants disliked was the groin, and head/face and legs were joint areas participants liked. However, head/face was an area that split participants. Some participants spoke of liking their face as it

looked feminine, whilst others disliked due to the laryngeal prominence (Adam's apple) and the presence of facial hair.

Participants mainly spoke about disliking areas they thought identified them as males, and liked areas they deemed to be more feminine. Participants said they disliked their hands and feet as they were large, and they liked their legs as they were slender or toned. This supported the theme of 'gender equals sex'; participants disliked characteristics that made them appear male to others. It also seemed participants had internalised what society deems acceptable physical characteristics for the female gender; for example, no body hair, slender hands, small feet.

Table 5.

Feelings on the body task

Area of body	Participants who disliked area (n)	Participants who liked area (n)
Head/Face	3	4
Shoulders/Chest	5	2
Torso/Hips	2	1
Arms	1	1
Groin	6	1
Legs	1	4
Feet	4	0
Hands	1	0

The themes, alongside the results from the tasks, gave some indication of what factors influenced gender identity development in assigned males with GD and ASC. The themes suggested gender identity was influenced by the relationship to stereotypical activities, supported by CIT data. Isolation arose as a theme in the interviews; supported by the social circles task data. The feelings on the body task demonstrated participants disliked areas others could perceive as male, or areas they considered not male due to internalised standards.

Discussion

Having explored what affected and influenced gender identity development in assigned males with GD and ASC, several ideas arose from the data. Participants considered their sex and gender to be the same: believing gender identity was unaffected by external influences. However, an apparent contradiction arose when external influences were described as influencing. Participants struggled to recall memories from their childhood, but ones they did recall, described relating to cismales and females through stereotypical gender interests. Findings suggested participant's gender identity development was influenced by their experience of cismales and females. They described cisfemales in an idealistic narrative, yet their experience of cismales seemed to describe them as possessing less desirable characteristics. Participants spoke of experiencing uncomfortable feelings, then using media sources to learn this was attributed to GD.

Identifying with peers through gender stereotyped interests suggests gender identity is influenced socially, as theorised by Bussey & Bandura (1999). However, none of the participants described being over-exposed in childhood to female stereotypes, so it leaves the question how participants were socially influenced into wanting to adopt a female gender identity. ASC could impact on participant's assimilation of gender stereotypes.

Jacobs, Rachlin, Erickson-Schroth and Janssen (2014) suggested people with ASC are less able to think flexibly about gender. Participants may relate to female interests, and as they struggle to think flexibly, it may feel too difficult to hold female interests and a male gender

identity concurrently, resulting in uncomfortable feelings, and subsequently a desire to transition genders. Participants spoke of flexibility in gender roles, but their behaviour did not exhibit this.

Along with cognitive rigidity, a common trait in ASC is difficulties with social skills (Gresham, 1981). Participants spoke of having few friends at school, being bullied, and struggling to relate to peers; the theme of ‘isolation’ emerged from the data. Holt, Skagerberg and Dunsford (2014) argued isolation was due to GD and not ASC; the present study was unable to support or dispute this. Participants spoke of identifying more with cisfemales, but very few of them had a social group of cisfemale friends. Participants may struggle to relate to others in general due to their social skills deficit. In addition, they may feel a sense of not fitting in as they struggle to relate to others, and this is the uncomfortable feeling they discuss when talking about holding the wrong gender identity. Often, when participants spoke of cisfemales, the narrative was idealistic. Transitioning from male to female may be seen as a step towards becoming this ideal person, allowing them to leave behind the less desirable traits they held as a cismale, such as aggression and limited social skills (the extreme male brain)

One theme that developed from the data was participants using media sources to understand their uncomfortable feeling. Participants found information suggesting the feeling was attributable to GD. Littman (2017) argued GD is a social contagion (the spread of ideas through imitation and conformity, Colman, 2014). This poses the question whether people with ASC are more likely to be influenced by media sources. Participants indicated they felt better able to relate to online friends; maybe this increases the likelihood of them accepting the

suggestion they have GD. The use of the media could be encouraging people to transition genders. Conversely, it could be empowering people to talk about their feelings on gender and act upon these; something previously silenced. Findings from this study suggest the latter.

None of the participants identified puberty impacted on their feelings of discomfort with their assigned gender. One participant said early puberty influenced the development of their gender identity, but explained it was feeling isolated from peers as they were not experiencing similar, rather than a discomfort with physical changes. Previous research identified puberty as a contributing factor (Steensma, Kreukels, de Vries, & Cohen-Kettenis, 2013). This may be a further example of the disconnection between participant's beliefs and their actions, which developed into the theme 'paradoxical'. It also may be they were already feeling discomfort with their gender prior to puberty.

Participants did not identify with the idea their parents influenced their gender identity (Witt, 1997), yet some spoke of trying on their mother's clothes or make-up. However, this fits with the narrative participants held of their gender identity being biologically determined and not externally influenced. Participants seemed to suggest these actions had revealed their gender identity to them, as opposed to influenced it. This could also be demonstrating an ASC trait of learning how people are, rather than innately understanding.

Practice implications

The data highlighted several different ideas of what may influence gender identity development in those with GD and ASC. It is imperative clinicians remain curious when understanding why someone wishes to transition genders, and with this population, certain areas should be explored further. Clinicians should explore the impact of isolation on the young person, and their expectations of how transitioning genders would help with these difficulties. It seems from the findings participants may think transitioning genders will alleviate isolation, and help them relate to others. It may be these traits are due to ASC and transitioning genders will not make these difficulties easier. Clinicians should explore service users internalised rules of how males and females should act. The findings suggest participants have flexible ideas about gender, but their behaviour is governed by stereotypes; attempting to add flexibility could help them feel more comfortable with their gender.

Limitations

The participants all expressed interest in the study; this could suggest they had a narrative about gender identity development they wished to be heard. This was also true where none of the participants expressed distress around their gender identity; they may have had a vested interest in ensuring they portrayed themselves as comfortable with their decision to transition in order to continue receiving treatment. This may have affected what themes developed, and subsequently what the findings suggest influenced gender identity in this population.

Participants explained they were supported by family, which developed as a theme; it would be expected that most young people referred to a GIC are supported by their family. It would be interesting to see if this theme developed in a non-GIC population, and whether being more removed from family allowed participants to reflect on whether their parents had any impact on their gender identity development. It may feel uncomfortable for young people to suggest their parents impacted on their current difficult experience when they are receiving ongoing support.

The study used a small sample as it was important to understand this phenomenon in-depth. Therefore, generalising the findings to others with ASC and GD should be met with caution. However, the aim of the study was to use a heuristic, inductive approach to identify future areas of more focussed research, given the current lack of contemporary theory and empirical research in this field.

Future research

Future research should explore how gender identity develops in those with ASC alone. There is little research in gender identity and ASC so it would be of interest to understand whether the influencers identified also appear in those without GD. This study could also be conducted in a population without GD or ASC as a comparison, and also with assigned females. Further research could also be conducted in a population post gender transition to explore whether similar themes arise. Particularly in regards to the theme of an idealistic narrative about transitioning to a female; it would be interesting if this narrative still exists post transition.

Research should be conducted to understand whether people with ASC use the media to learn how to be and whether they are influenced more by media sources compared to peers. This could add evidence to the argument that GD arises from social contagion (Littman, 2017).

Crenshaw (1991) developed the concept of intersectionality; the idea people experience multiple aspects of identity simultaneously, with different aspects impacting each other. This theory would argue the interpretation of a person's gender identity is impacted by the interpretation of the ASC diagnosis. Therefore, the development of gender identity in people with GD and ASC must be seen through the sphere of them both affecting each other (Shmulsky & Goboo, 2018). There has been recent interest in trying to disentangle this phenomenon; specifically focusing on what it is about an ASC diagnosis that drives people to develop GD (de Vries et al., 2010). However, Crenshaw (1991) would argue identity develops due to how they and others perceive GD and ASC simultaneously and research should be focused on understanding this (Shields, 2008).

Reflections

The social circles task was initially employed as a rapport building exercise to facilitate engagement in the interview. However, when analysing the results from this task after the themes had been developed, it became apparent the results supported the theme of isolation. The body task was initially used to explore participant's feelings on puberty, however it did not elicit this data. When reviewing the results post thematic analysis, they supported the theme of

stereotyped genders as participants wanted to possess the characteristics they felt made them female. Both tasks were analysed following thematic analysis.

It was difficult within this study to critique the biological theories of GD, such as the extreme male brain theory (Baron-Cohen, 2009), as participant's held a strong belief that GD arose due to biology. The researcher wished to be as respectful as possible when conducting this study and a critique of these theories in this present study may compromise that position.

A difficulty in conducting this research was the tension between remaining neutral in developing the findings, and also the potential if the findings were not supportive of the participants, and their desire to transition.

Conclusions

This study showed the development of gender identity in people with ASC and GD was influenced by a multitude of factors. Participants spoke of their gender identity as essentialist. However, when participants spoke of relating to a female gender identity, they expressed this through gender stereotypical interests. Participants highlighted they had felt a sense of uncomfortableness and had used social media to research this; with GD being presented as a reason for this uncomfortable feeling by varying sites. Future research should aim to explore gender identity in those with ASC alone to see how this compares, and with assigned females.

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LAURA E. FISHER, BSc (Hons), MSc, PGDip

Major Research Project

Section C: Appendix of Supporting Information

All identifiable information had been removed

A thesis submitted in partial fulfilment of the requirements of Canterbury Christ Church

University for the degree of Doctor of Clinical Psychology

April 2019

SALOMONS CENTRE FOR APPLIED PSYCHOLOGY

CANTERBURY CHRIST CHURCH UNIVERSITY

Section C: Appendix of Supporting Material

Appendices

- A. Data extraction forms
- B. *This has been removed from the electronic copy*
- C. *This has been removed from the electronic copy*
- D. Support line numbers for participants
- E. Recruitment flyer
- F. Interview schedule
- G. Participant information sheet
- H. Participant consent form
- I. Social circles task and exemplar
- J. Feelings on the body task
- K. Example genogram
- L. *This has been removed from the electronic copy*
- M. Table of themes and quotes
- N. Abridged research diary

O. Example list of codes and themes

P. Report to service, R and D, and NHS Ethics

Q. Summary report for participants

R. Declaration of the end of the study

S. Journal for submission's notes for author

Appendix A. Data Extraction Form

1. **STUDY TYPE** - Randomised controlled trial, Controlled clinical trial, Cohort analytic, Case-control cohort, other
2. **PARTICIPANTS**
 - Eligibility criteria for participants
 - Are participants representative of target population?
 - Settings and locations where the data were collected
 - Were there differences between groups before the intervention?
 - Were any confounds controlled for?
3. **RECRUITMENT**
 - Dates defining the periods of recruitment and follow-up
4. **SAMPLE SIZE**
 - How sample size was determined
5. **BLINDING**
 - Were outcome assessors blind to treatment group?
 - Were participants aware of the research question?
6. **BASELINE DATA**
 - A table showing baseline demographic and clinical characteristics
7. **OUTCOMES**
 - Completely defined outcome measures, including how and when they were assessed
8. **STATISTICS**
 - Were data collection methods valid and reliable?
 - Was the drop-out rate reported?
 - Statistical methods used to compare groups for primary and secondary outcomes
 - Methods for additional analyses, such as subgroup analyses and adjusted analyses
9. **RESULTS**
 - Were all clinically important outcomes considered?
 - Can the results be applied in your context?
 - Were confounding factors identified?
 - Were strategies to deal with confounding factors stated?
 - Were the outcomes measured in a valid and reliable way? Was appropriate statistical analysis used?
For each primary and secondary outcome, results for each group, and the estimated effect size and its precision
 - Results of any other analyses performed, including subgroup analyses and adjusted analyses, distinguishing pre-specified from exploratory
 - Generalisability (external validity, applicability) of the findings
 -

STUDY (<i>Author, year & Country</i>)	
STUDY TYPE	
PARTICIPANTS	
RECRUITMENT	
SAMPLE SIZE	
BLINDING	
BASELINE DATA	
OUTCOMES	
STATISTICS	
RESULTS	

Appendix B. Ethical Approval

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Appendix C. Letter of Access

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Appendix D . Participant Support Numbers



Participant Signposting Sheet

Should you feel distressed any time after this interview, please contact these helplines to seek support.



Childline - 0800 1111

Beaumont Society (*national self- help body run by and for the transgender community*) - **01582 412220**

Depend (*an organisation offering advice, information and support to all family members, spouses, partners and friends of those in the transgender community*) - **info@depend.org.uk**,

<https://www.facebook.com/DependSupport>

GIRES (*an organisation to improve the lives of trans and gender non-conforming people*) - **01372 801 554**

Mermaids (*family and individual support for gender diverse and transgender people*) - **0344 334 0550**



Appendix E. Flyer for Clinicians

RESEARCH PROJECT – REQUEST FOR RECRUITMENT



My name is Laura Fisher, and I am a trainee clinical psychologist, working alongside Dr XXXX, exploring the increase in referrals to the clinic from young people with ASC.

I would like to interview participants on how their gender identity has developed over their lifetime.

PARTICIPANTS NEEDED:

- **ASSIGNED MALE**
- **Aged between 15-18 years**
- **Diagnosis of AUTISM SPECTRUM CONDITION**
- **Diagnosis of GENDER DYSPHORIA**

WHAT IS INVOLVED? Completing an interview with a researcher.

WHO TO CONTACT: PLEASE PASS THE DETAILS OF THE SERVICE USER TO

XXXX (XXX@XXX.nhs.uk)

Appendix F. Interview Schedule

Interview Schedule

- Introduce self (*LAURA, TRAINEE CLINICAL PSCYHOLOGIST, AT UNIVERSITY*)
- Ask participant what they wish to be called and what pronouns they would like to use (he/him, she/her, they/them)
- Ask if they would like a drink of water or breaks

INTRODUCTION

We are here today as you have agreed to take part in this study, and I am very grateful for your participation. I just want to spend some time telling you about the study and answering any questions you might have about the study or your involvement. I am going to give some explanations for terminology that you might already be familiar with, but this is just so everyone can start off from the same position.

PURPOSE OF PROJECT, ESTABLISH TERMINOLOGY AND SELF REFERENCE

This study is about how assigned males (that means those who were born male in sex) grow up to understand what it is to be male. This project involves assigned males who have Autism; this is sometimes called Autism Spectrum Condition. Do you know what that means? (*Yes – get participant to describe it, if No then give definition. **Autism is a lifelong condition and it affects how a person communicates and how they experience the world around them. Autism is seen as a spectrum and people can be seen as more or less autistic depending on where they are on this spectrum.***

Do you see this condition as something that relates to you? (*do they self-identify as ASC/ASD*). How do you prefer to describe yourself, do you say ‘I have ASC/ASD’ ‘I am on

the autism spectrum?', or do you use other words? If you do have ASC do you prefer to be known as someone with ASC/ASD, an autistic person, someone on the spectrum?

This research is also looking at what we call gender identity – do you know what this means?

*(Yes - get participant to describe and correct/add to if needed, if not give standard definition and check out understanding. **Gender identity is what gender we feel inside, such as male and female, both or neither and this identity may be different to the one we received at birth**). (Offer to use gender unicorn if not sure of understanding – but say this might be seen as quite immature but it's what is often used in gender studies)*

Do you know what the phrase gender dysphoria means? *(Yes - get participant to describe and correct/add to if needed, if not give standard definition and check out understanding of it.*

Gender dysphoria is when our internal sense of gender does not match with the gender we were given at birth, commonly termed 'GD' – give example). Would you identify as relating to GD?

I will be meeting with several young assigned males who have ASC and GD. I hope to gain a better understanding and explore gender identity so services and clinicians can provide better support to young people and their families.

It is entirely up to you if you want to take part. I will also be recording this interview so I can analyse it better later, however I will be the only person who listens to this recording.

Do you have any questions about the study?

INFORMATION ABOUT PROJECT AND GAINING CONSENT

- *Give the participant a copy of the information sheet and read it aloud.*
- *Read aloud the consent form and go through with participant to ensure understanding.*

- Ask participant to sign consent form

DEMOGRAPHIC INFORMATION

Now just so I can get to know you a bit better, I am going to ask you some questions about yourself. Ask demographics from participant –

AGE – How old are you?

EDUCATION – Do you attend school? If so, what year are you in at school?

HOBBIES – What kind of things do you like to do in your spare time?

GENOGRAM – Complete.

TASK 1 - SOCIAL CIRCLES TASK

It would also be useful for me to understand who is around you and who is important. I would like you to draw on this sheet the people you are close to in what we call social circles. This can be family, friends or people we know in other ways, such as teachers. (*demonstrate social circles task- present the pre-drawn one and then ask the participant to first write themselves in the middle, then people who are closest in the inner circle, then less close in the other circles. Ask for names and who this person is*).

TIMELINE DEVELOPMENT

Now it would be really helpful if we started to think about your development since you were born and maybe how your gender identity developed.

It can be really helpful if we create a timeline so we can think about the different times. I will start by asking you questions about your childhood going right up to talking about now.

Early Childhood (0-5years)

- What was your early childhood like? I am thinking about the age between being born and when you were of school age at 4/5 years old. Did you go to school or where you educated at home?
- What was it like growing up as assigned male? How did you express your gender identity (*male/female*)? (*think about clothes/games/play/behaviour*)? Were you expected to act in a certain way at all (*from parents/peers*)?
- How did you relate to other children who were the same assigned gender as you (by relate I mean did you connect with them, see similarities with them, feel you were the same as other children of your assigned gender)? How did you relate to assigned females?
- How did you relate to your parents at this age (by this I mean what was your relationship like with your parents? Did you feel you were closer to one rather than the other? Why?)
- How did you relate to other adults (*nursery teachers etc*) (did you like them, dislike them, prefer assigned males/assigned females/like people in authority)?
- Was there anything in this stage that you think influenced your gender identity developing? (media, family, peers)

Later childhood (5-11)

- What was it like at primary school (*if they went to school*)? This is when you were 5 – 11 years old? Year's reception to year 6? (*orientate by asking who their teacher was if they attended school*)

- What was it like growing up as assigned male? How did you express your gender identity (male/female)? (think about clothes/games/play/behaviour)? Were you expected to act in a certain way at all (from parents/peers)?
- Did teachers, parents or siblings respond to you in anyway because of your gender?
- How did you relate to other assigned males? Assigned females?
- Was there anything in this stage that you think influenced your gender identity developing?
- Did your gender identity change at all? If so, what do you think influenced this?

Early adolescence (11-13)

- What was it like at secondary school (*if they attended school*)? This is years 7 – 9, ages 11-13.
- What was it like being an assigned male? How did you express you were an assigned male? Were you expected to act in a certain way at all?
- Did teachers, parents or siblings respond to you in anyway because of your gender?
- How did you relate to other assigned males? Assigned females?
- How did you fit in with other peers?
- How did you relate to your parents at this age?
- How did you relate to other adults (teachers etc)?
- Was there anything in this stage that you think influenced your gender identity developing?

Later Adolescence (14-18)

- What was it like being an assigned male in later adolescence, between the ages of 13 and now? This is year 10 onwards if you attended school? How did you express your gender identity? Were you expected to act in a certain way at all?
- Did teachers, parents or siblings respond to you in anyway because of your gender?
- How did you relate to other assigned males? Assigned females?
- How did you relate to your parents at this age?
- How did you relate to other adults (teachers etc)?
- Was there anything in this stage that you think influenced your gender identity developing?
- What is a typical male or female for you?
- What does it mean to be a woman?
- How do you feel about your sexuality?

Future

How would you like to express your gender in the future? (*male/female/cisgender*)

Autism

How old where you started to realise you were on the autistic spectrum?

How old were you when you were diagnosed with ASC?

How has this impacted you?

TASK 2 – FEELINGS ON BODY

- I am now going to ask a different question, one about a physical aspect. (*show picture of body*)

- I am going to ask you some questions about your feelings towards your own body and I would like you to mark on the body the area you talking about. If it's a positive body part, can you use green to mark it, and if it is a body part you are not happy with, can you use red.
- How do you feel about your body? What areas do you like? Are there any areas you dislike? Has this changed over the years?

ADDITIONAL INFORMATION

Any additional information you think is important for me to understand your gender identity development/how much you felt like a male/female/non-binary (*non-binary is when you do not consider yourself to be male or female*)?

I am now going to ask you some questions about the process of being interviewed, and this is more so I can keep working on the questions we asked to ensure we are capturing the right information we wanted.

Reflective Questions

- How have you found being interviewed?
- Do you feel there are any questions I should have asked?
- Are there any questions you wished I had not asked?
- Is there anything else you would like to say that I haven't asked?

Appendix G. Information about the Study

INFORMATION ABOUT THE STUDY

**An investigation into the influences on gender identity development in assigned males
with a diagnosis of Autism Spectrum Condition (ASC) and**

Gender Dysphoria (GD)



Hello. My name is Laura Fisher and I am a trainee clinical psychologist at Canterbury Christ Church University. I would like to invite you to take part in a research study. Before you decide, it is important that you understand why the research is

being done and what it would involve for you.

Talk to others about the study if you wish.

(Part 1 tells you the purpose of this study and what will happen to you if you take part.

Part 2 gives you more detailed information about the conduct of the study).

What is the purpose of the study?

To investigate the influences on gender identity development in assigned males with a diagnosis of Autism Spectrum Condition (ASC) and Gender Dysphoria (GD). ASC affects how a person communicates and how they experience the world around them. GD is when our internal sense of gender does not match with the gender we were given at birth.

Why have I been invited?

You are a service user at the Gender XXXXX (GXXX) and have a diagnosis of GD. You also have a diagnosis of ASC. I would like to understand more from your perspective on how your gender identity has developed.

Do I have to take part?

It is up to you to decide to join the study. If you agree to take part, I will then ask you to sign a consent form. You are free to withdraw at any time, without giving a reason.

What will happen to me if I take part?

I will ask you several questions about your gender identity, how it developed and what you think influenced it. I will ask you to help me understand your life by drawing out your friends and thinking about your body and how you relate to it.

I will record these interviews using a Dictaphone.

What are the benefits if I take part?

This research will add to the limited evidence we have on how gender identity develops in people with ASC. This will help services tailor what they deliver to the needs of people with these difficulties.

You may also find it interesting to talk about how your identity has developed, and the feelings you have towards this.

What are the risks if I take part?

On a few occasions, some people may become distressed by the topic of gender identity development during the interview. However, I am a therapist so can help manage this distress, and you will also be given support numbers at the end of the interview, should you feel you need support following, which we can discuss together.

What if there is a problem?

Any complaint about the way you have been dealt with during the study or any possible harm you might suffer will be addressed. The detailed information on this is given in Part 2.

Will information from or about me from taking part in the study be kept confidential?

Yes. We will follow ethical and legal practice and all information about you will be handled in confidence. The details are included in Part 2.

This completes part 1.

If the information in Part 1 has interested you and you are considering participation, please read the additional information in Part 2 before making any decision.

Part 2 of the information sheet**What will happen if I don't want to carry on with the study?**

You can withdraw at any time, even during the interview. You can ask for your data to be destroyed if you no longer wish for it to be part of the study.

What if there is a problem?

If you have a concern about any aspect of this study, you should ask to speak to me and I will do my best to address your concerns (020 8319 5500). If you remain unhappy and wish to complain formally, you can do this by contacting Professor Paul Camic, Research Director, Salomons Centre for Applied Psychology – paul.camic@canterbury.ac.uk (03330117070).

Will information from or about me from taking part in the study be kept confidential?

Interviews will be audio recorded. All data will be anonymised when writing up and stored securely. No other person will have access to the raw data. Confidentiality would only be

broken if I felt there was a risk of harm to anybody else by not sharing the information – but I would try and inform you about this before I did so.

Data from the study will be stored on an encrypted USB data stick. This will be backed up onto the NHS secure IT system. Paper documentation will be stored in a locked briefcase. This data will be transferred to Canterbury Christ Church University via a password protected CD. The university will store the data for five years after completion. If the research is accepted for publication it will be stored for a further five years post publication.

Participants have the right to check the accuracy of data held about them and correct any errors.

What will happen to the results of the research study?

We are aiming to publish the results in a special edition journal so there is a better understanding of GD and ASC, and to promote more research to be completed in this area.

Who is organising and funding the research?

The study was organised by myself, Professor Jan Burns (Canterbury Christ Church University) and Dr XXXX (XXXX) with approval from Canterbury Christ Church University.

Who has reviewed the study?

All research in the NHS is looked at by an independent group of people, called a Research Ethics Committee, to protect your interests.

Appendix H. Consent Form

CONSENT FORM

Participant Identification Number for this study:

Title of Project: An investigation into the influences on gender identity development in assigned males with a diagnosis of Autism Spectrum Condition (ASC) and Gender Dysphoria (GD)

Name of Researcher: Laura Fisher

Please initial box

1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.

☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason.

☐

3. I understand the interview will be audio-recorded and I consent to this.

☐

4. I understand all data will be fully anonymised and my identity will not be disclosed.

☐

5. I agree to take part in the above study.

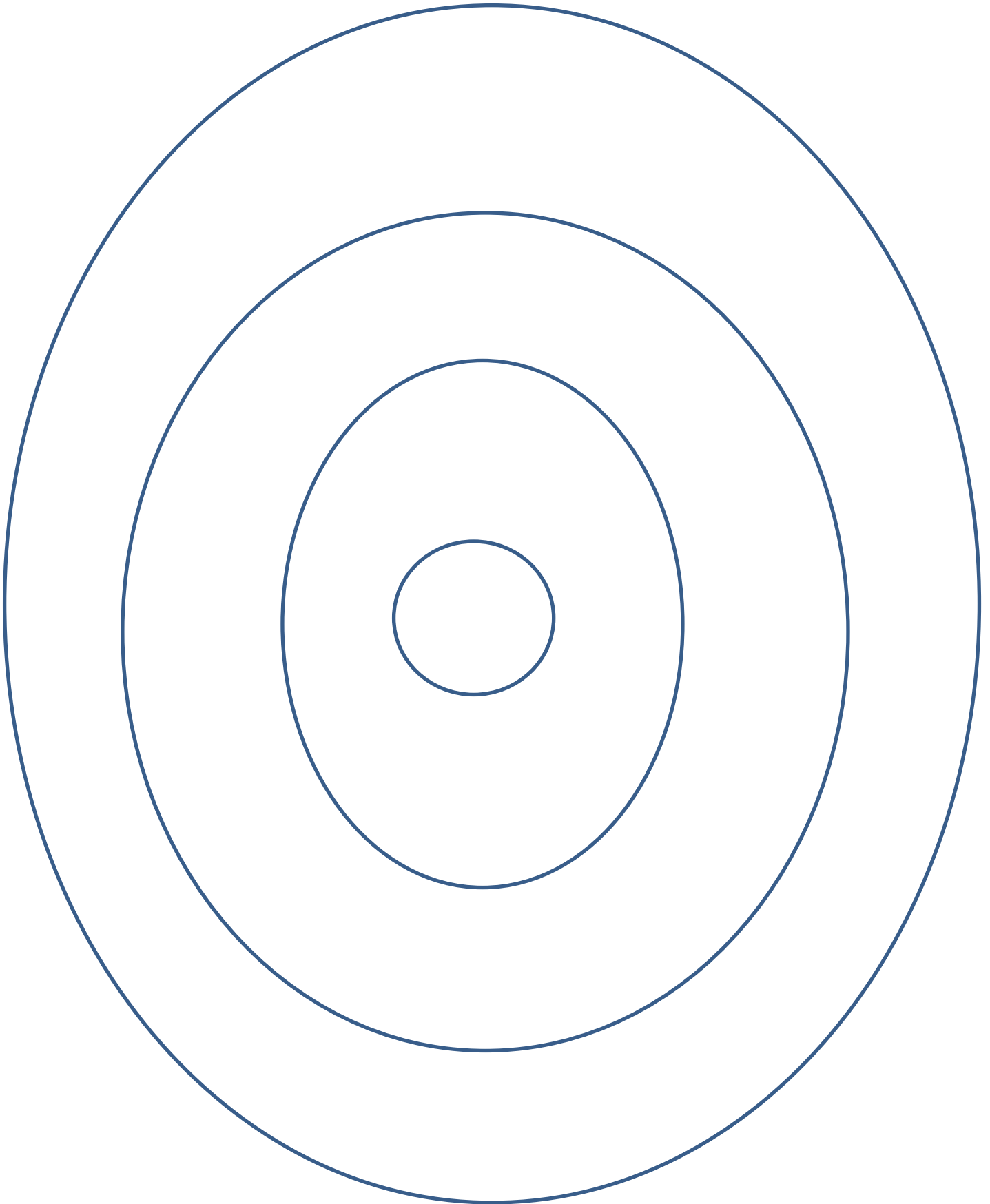
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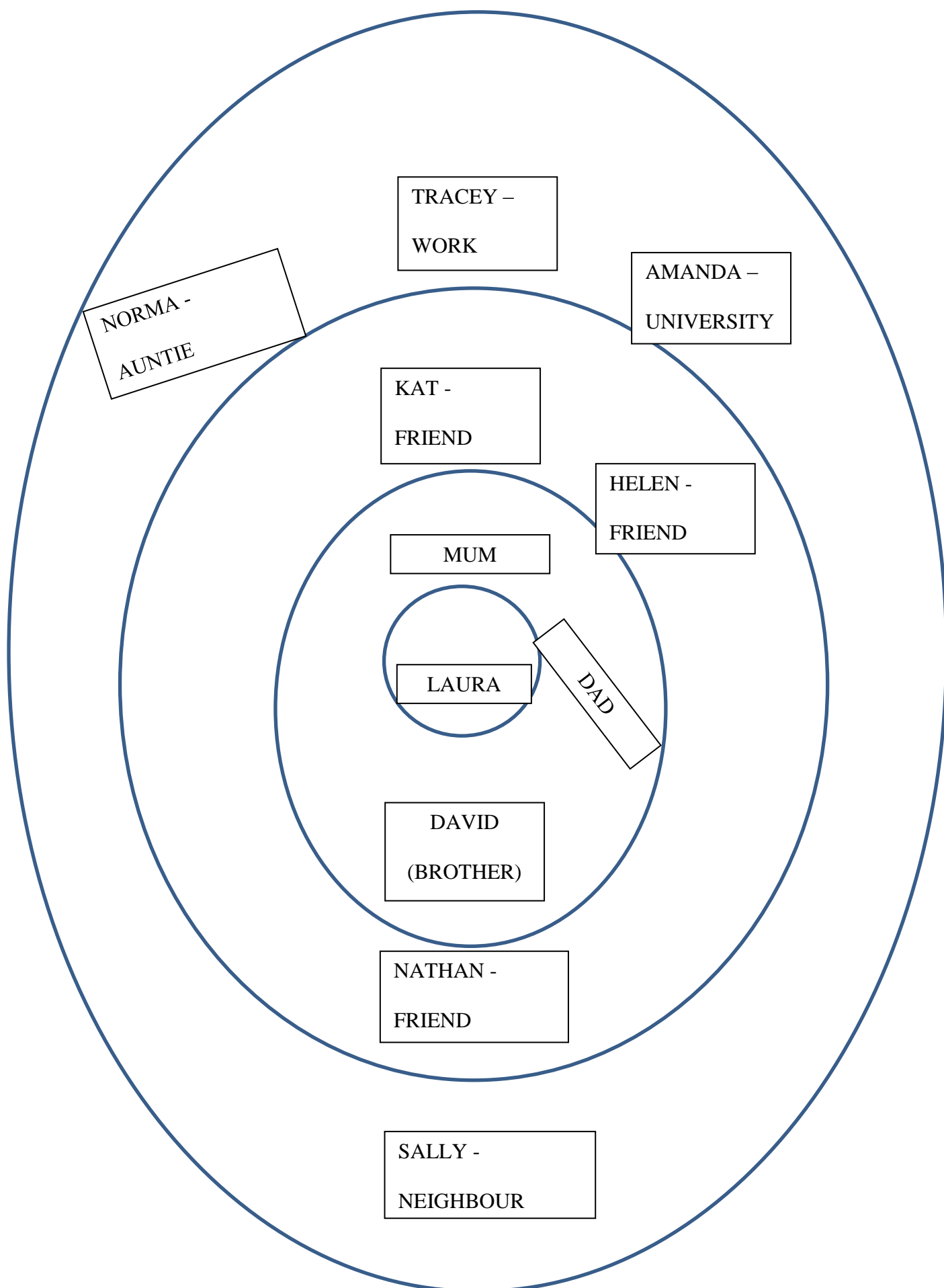
Name of Participant _____ Date _____

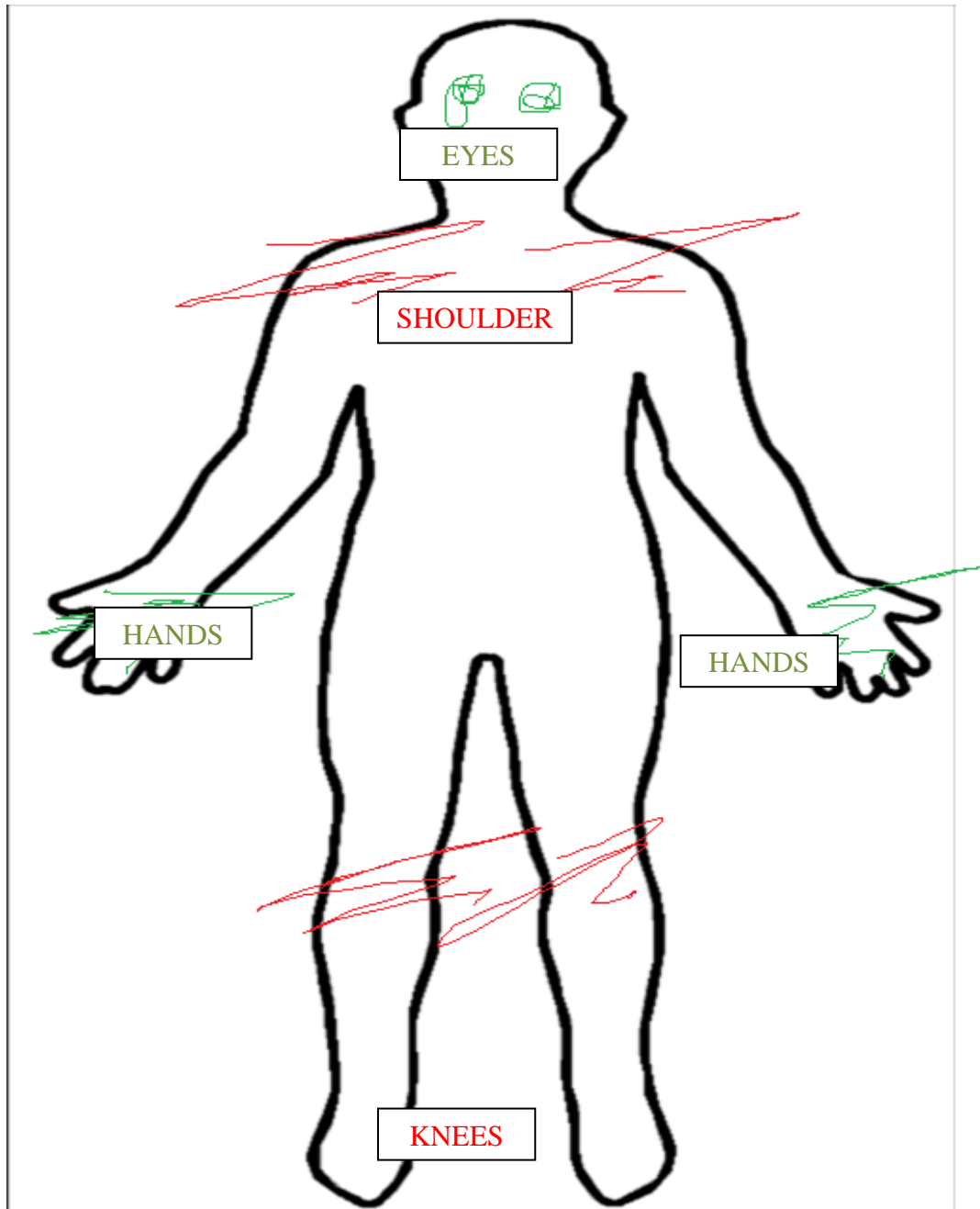
Signature _____

Name of Person taking consent _____ Date _____

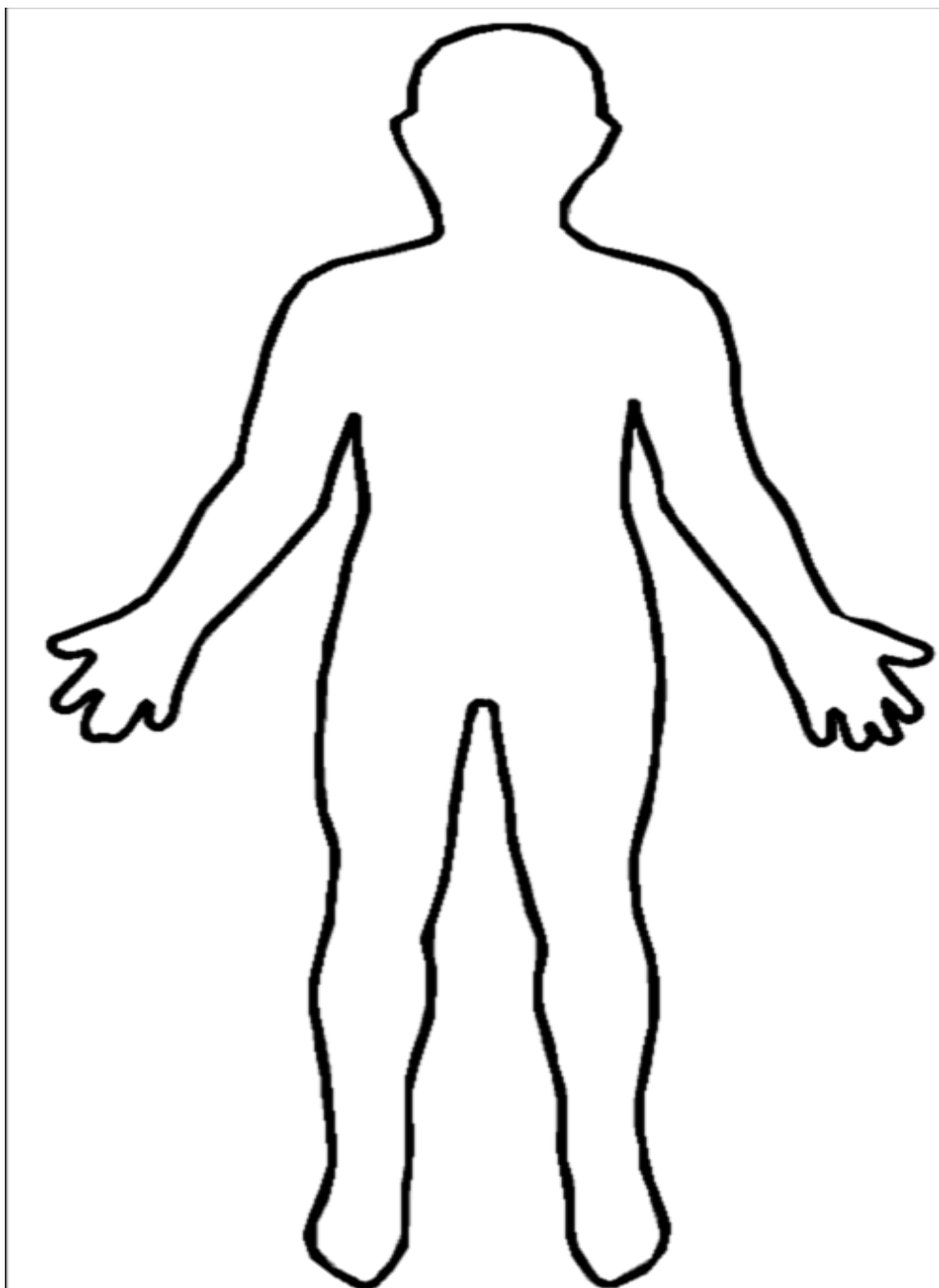
Signature _____

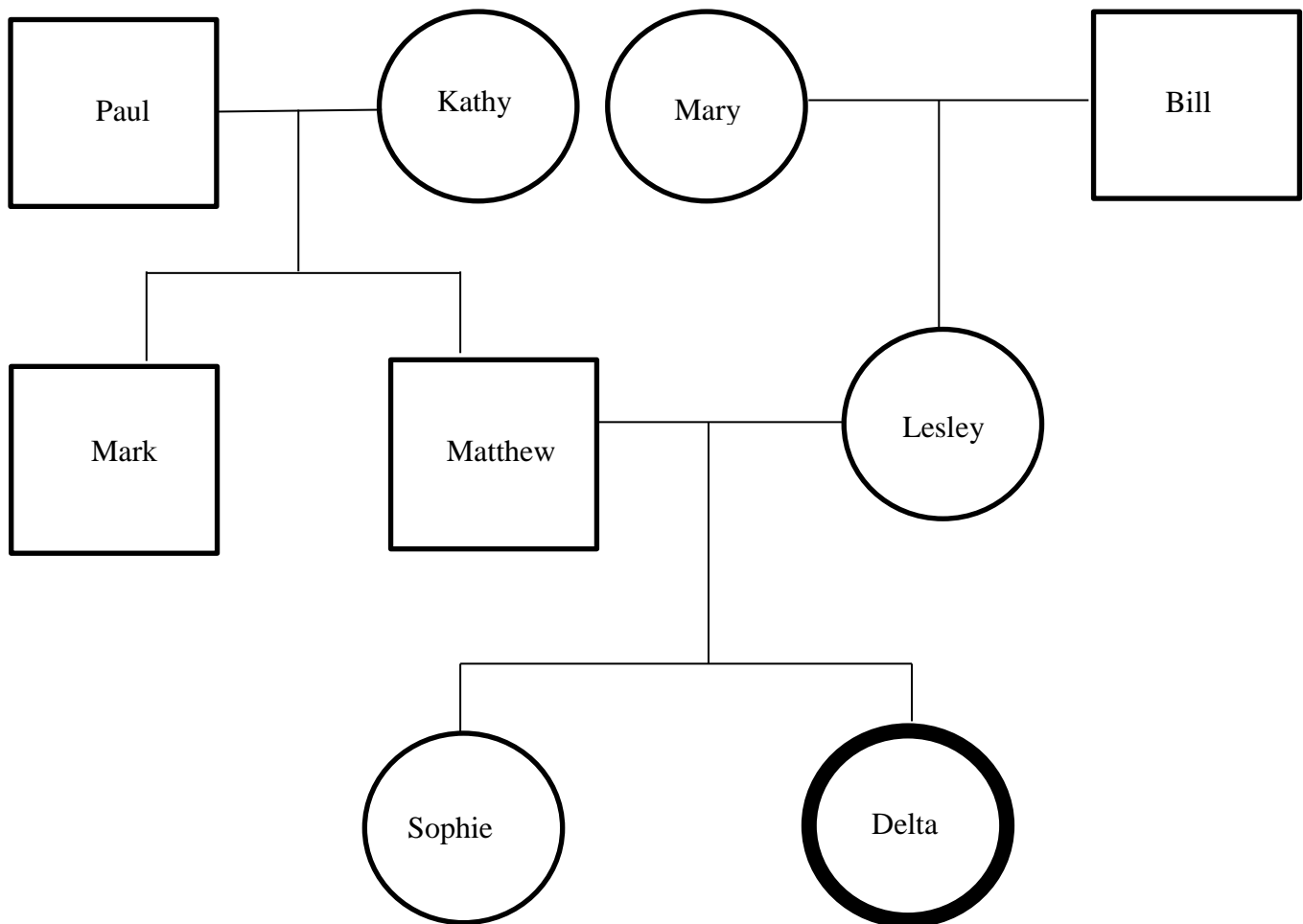
Appendix I. Social Circles Task

SOCIAL CIRCLES TASK - EXAMPLE

Appendix J. Feelings on the Body Task**FEELINGS ON BODY - EXAMPLE**

FEELINGS ON BODY



Appendix K. Example Genogram

Appendix L. Annotated Transcript

This has been removed from the electronic copy

Appendix M . Table of Themes and Quotes

Table 1.

Main themes and sub-themes.

Main theme	Sub-theme	Illustrative quotation (s)
Narrative	Gender equals sex	<p>‘I was born in the wrong body as it has always been there’ (Participant 6).</p> <p>‘It’s all inside, it feels all inside, it’s just, what feels more fine and more natural for me’ (Participant 5).</p> <p>‘I don’t think I can put any specific label on it [why I want to transition], as far as I can remember, it was just a feeling of it, there wasn’t any reasoning, there wasn’t a particular thing behind it, it was just a feeling that that feels more right. It wasn’t at that stage it doesn’t feel right to be male, it was just it felt more right to be female’ (Participant 7).</p> <p>‘I think I would have always ended up here regardless of influences, I think the only thing [that] influenced is how soon I got here’</p>

(Participant 7).

Inaccessible memories

‘I don’t remember much of it so it’s going to have to be very vague answers I am afraid’ (Participant 5).

‘I don’t have strong memories’ (Participant 3).

‘All memories are that sort of thing for me *[pictures]*’ (Participant 6).

‘There’s a slight problem with talking about how I grew up as there’s a large gap in my memories between the ages of 6 and 8’ (Participant 3).

Idealistic

‘I think women are a lot more natural is what my experience has been in terms of being able to think about things and to work things out’ (Participant 3).

‘They are more thoughtful’ (Participant 2).

‘Females have sweet, gentle, personalities’ (Participant 8).

Relational

Objects

‘I had the same interests as other girls in the school like K-pop’ (Participant 2).

‘I always played female

	games like sims’ (Participant 4).
Fictional characters	<p>‘I’ve always related to non-human characters’ (Participant 3).</p> <p>‘I would always, I always related a lot more to female characters in fiction books or whatever’ (Participant 4).</p> <p>‘Yeah, erm so this is going to sound strange, at that time, I got into this internet subgroup called fairy fandom...they are like human-animal hybrids...a bit like acting and online character creation, but for me, this was sort of a bit of an awakening, like you know, it wasn’t like I had this character not because I liked them, or because I wanted to be with them, but because I wanted to be them...I had a female character of a kind of wolf and shark and a little bit of a dragon’ (Participant 6).</p> <p>I first saw a princess in a Cinderella pantomime and she was my favourite’ (Participant 2).</p>
Isolated	<p>‘I didn’t have any close friends. I barely had any friends’ (Participant 4).</p> <p>‘I was on my own a lot’</p>

		(Participant 3).
		‘I guess you could say reclusive, I am a fan of being on my own’ (Participant 5).
		‘I guess this kind of made me feel lonely in the sense that I didn’t know what was happening and I didn’t know why people did this. I didn’t feel physically alone, I felt mentally as I didn’t think the same way as others thought’ (Participant 8).
Family		‘...Gotten closer because it has been quite a struggle trying to get back into school’ (Participant 3).
		‘I believe it is the same as it has always been which is really strong’ (Participant 5).
		‘I was closer to my mother than my father, and we are still very much close now’ (Participant 3).
		‘I’d say we were fairly close...I think we have got closer’ (Participant 7).
Paradoxical	Stereotyped	‘I act in a feminine way and like to wear make- up’ (Participant 2).
		‘I wear my hair long to be feminine’ (Participant 4).
		‘Erm, I guess it can be

	<p>whatever one wants it to be [to be female], I don't think there's a set specific definition for it. But I show people I am female with my clothes, and I guess personality to an extent but I guess clothes mostly' (Participant 8).</p>
Proxy informing	<p>'P: I started off with friends and then we went around the school and told teachers.</p> <p>I: And how did they react?</p> <p>P: Oh everyone was fine with it' (Participant 2).</p> <p>'I think that the school told them actually but they were kind of expecting it as I'd started to wear women's jeans and they were okay' (Participant 8).</p> <p>'The school told my parents as I wanted to change my name on the register' (Participant 3).</p>
Media	<p>'I went online and found out about transgender people, oh yeah' (Participant 6).</p> <p>'...sort of represented to myself the female character and I role played a female character within certain games and it was, if sort of clicked, and I realised, hang on, there's something here, so I started to explore that</p>

online' (Participant 3).

' 'I just started to search up gender identity and what it meant cuz someone on the playground one day at school said to me "oh I know someone whose trans, there's this girl" they didn't actually say that, they said "I've got a girl who wants to be a boy" and I can remember going home and searching on the pc for what that meant and it said transgender, and I thought "what's that?" and I read it on a Reddit forum a long time ago, this was 5-6 years ago about what meant, and I was like, woo, I don't think I really understood at it 13, but it really made sense, it really struck me, I thought "wow, oh my", I was just gobsmacked, I just thought "this is really really applicable to me, that's how I feel"' (Participant 1).

'I mean 13 is pretty much when I started to have unrestricted internet access because my mum trusted me, and erm, so that's when I started going on social media and I started experiencing people` with gender dysphoria but didn't know then, and like I started to, they told me how they felt, and I started to question myself, and I started to realise I had these

feelings and didn't feel comfortable and stuff. It wasn't that they were telling me I was trans because of this, it was more the case of they were like *yeah this is how this makes me feel* and I was like *oh I can relate to that*' (Participant 2).

Identity	'I am who I am'	<p>'I feel maybe in some ways I might be a little non-binary but I think that's just in the sense of how I process myself internally, I feel like I can separate how I feel internally, like the way I approach the world externally' (Participant 4).</p> <p>'I am my own person and look down and denounce that culture [popular culture] when I can, as I always have' (Participant 6).</p> <p>I was just like, I am me, I'm just you know, me' (Participant 5).</p>
Experience	Cismales	<p>'From what I have been told I was quite aggressive when younger' (Participant 3).</p> <p>'I used to get angry very easily' (Participant 2).</p> <p>'Boys are kind of aggressive, kind of hostile, boys at my old school, they were kind of rowdy and scrappy and stuff like that, I guess you could say that about</p>

		<p>pretty much everyone in my school now also' (Participant 8).</p> <p>I think boys are genetically more boisterous, they just have inherently different mind sets and stuff, we are socially dimorphic species and there's nothing wrong with that' (Participant 6).</p>
Autism Spectrum Disorder	Effect	<p>'Not at all, I don't think so' (Participant 2).</p> <p>'I don't know if they have or they haven't really as I have lived with them my entire life and I don't know how I would feel without them [diagnoses of ASC & Asperger's]' (Participant 3).</p> <p>'No impact in later years but it did when I was younger as everyone wanted to focus on my ASC, rather than me and what I wanted' (Participant 6).</p>

Appendix N. Abridged Research Diary

The following excerpts have been reproduced from a hand written research diary.

Opting for the project

I am feeling hugely anxious about this method of applying for the project I want. This reminds me of my undergraduate days when I missed an email from my supervisor about the dissertation project and had to fight to get the place. I am researching about the project, but also thinking about what it was that led me to want to complete this research. I think I am intrigued about the process at GXXS; what happens there but also why people choose to transition genders. I am also interested in the drug side of their work and I think that fits in with my attraction to psychology and physical health.

Creating the project

I really want to complete research into how people go about developing their gender. There seems to be research saying it is due to different stages people go through – stability and constancy, and that maybe people with ASC don't go through these stages. This seems like a very interesting idea. It is hard to create a project I am interested in but that is also viable, and fits in with the research interest of my supervisor and GXXS.

I have been given the project I am going to work upon, and we have agreed which supervisors we will be working with. I am happy with who I have been given as I feel they will really support me, and I know I will be anxious and will need their reassurance.

My supervisor asked me what my own gender identity was today. I actually did not know what to say. How funny is that? I was really stumped, and said I was female, but now I am contemplating what that means? Does my gender identity move dependent on what I am

doing? Or is that the point that it does not need to move as activities and gender are not related? Why do I feel like it is actually a bit of a bad thing to be considered as having a fully female gender identity?

Recruitment

I am already feeling anxious about this – how on earth will I manage to get the participants I need? I hate this part of research as I feel you have to rely so much on others and it is not just about being able to get work done.

So I have decided to drop NAS as I am not getting anyone from there for my research. I am going to email the CAMHS teams in the XXX. I thought this would be the easier arm to recruit for, but clearly not.

I have changed the research poster for my ASC arm – one of my partner's friends gave really negative feedback about it which hurt.

I am really worried about recruitment now as I have had no interest in the ASC arm. I am feeling angry and I know I am projecting this out at others. I am also feeling angry when it is constantly suggested I attend meetings in the week for recruitment – I also have a job as well!

I find when people ask me about my 'thesis' they are either really interested, or it is a really awkward few minutes. I had a disagreement with one of my peers on the course who said gender dysphoria must be a biological concept.

Research Team

We are working together in a research team – there are 3 of us. I think I will like the support but I will also hate the competitiveness. I am competitive but hate it – I know I will want to be finished first, but I would rather just not have the competition. My supervisor has

suggested we all go through ethics together which means I have to wait for them – I hate having to wait for others! If they are really slow that means my project will suffer.

I am feeling really despondent as a fellow member of the research team has completed their recruitment. I am wondering if it was such a good idea to work as a team as it seems like not everyone at GXXS can hold all our projects in mind to be able to recruit to.

Deciding on a Research Method

My supervisor really wants me to use PAR and CIT but the more I read about them, the more they don't sound like good methodological stances. I feel like I have to do this as she is quite keen upon it and I don't really have a valid reason not to!

We have now decided to drop PAR as we weren't doing it properly and it felt even worse to try and do it a little bit when it is meant to be about full participant involvement in the research.

Ethics

We are going through ethics now and I am hoping I am first as I know I will really struggle with seeing the others go through first – I just won't be able to cope with that level of anxiety!

Today was the review before the panel – it was not as nerve wracking as I thought! I felt really vindicated when they berated my supervisors for not attending the review.

I am so happy it has got through with minor amendments. I have heard horror stories about this.

I am now dealing with the trusts R&D process. They are struggling with honorary contracts. I feel a bit annoyed that I have to pave the way for the other girls; I do all the donkey work

and then it's okay for them! But I guess that's the price I pay for being anxious about getting it done.

I have now decided I want to do some interviews over the telephone as it will be so much easier for people to participate. It now has to go through ethics again. I realise I am so eager to get things in early I end up rushing and then it takes me twice as long.

GXXS

I have just presented my research at GXXS and there was a big discussion about the use of diagnosis in the research – we are only asking for people who have been diagnosed with GD. They said this meant a lot of people would be missed. I think this is a really valid point but I guess we need to set a criteria and NHS ethics wanted it to be based on diagnosis.

Interviews

I have started interviewing and one of the hardest things is remembering the correct pronouns. It can be really difficult if the young person presents with a masculine voice as they do not want the camera on either. I am scared I will use the incorrect pronoun and offend them.

I think I was so worried during my first interview about offending them I did not ask as many follow up questions as I should have. However, the conversation really flowed and the young person was not defensive at all about my questions. I am worried I have not got the right data – it feels that people feel they have been born in the wrong body and nothing influenced their gender.

My interviews are going really well and I am really impressed with how easy it has been to strike up a rapport – I was worried with ASC that would make it hard. It was a lot easier doing an interview face to face though.

I am finding it really difficult not to go into therapist mode when they are talking about really distressing things, and I am feeling the urge to validate their feelings.

It is interesting when the participants say thoughts they have about females, such as them wearing make-up all the time, when I am sat across from them not wearing any! I wonder if it challenges their perception or if they just think I am not very feminine?

I am still concerned the interviews are not getting the data we want but I have spoken to my supervisors and they have been very containing about it, and reassuring.

Bracketing Interviews

An initial bracketing interview was conducted with my research team before we started to interview, and then several during the interview process.

I spoke of how I was reflecting on whether it would be awkward that I would be interviewing people who were wishing to be a female – something I represent. I wondered whether I would try and be less female during the interviews, or whether I would own that. I spoke of how annoying I found it that psychology had been quite lacking in adding to the literature about gender identity – it feels biological theories have really advanced in the field. We discussed how we all felt about our own bodies and how we had felt about puberty. I had recalled how uncomfortable I had felt going through puberty relatively early – we discussed whether that had been something that had drawn us to this research. We also discussed how people do not really understand gender identity unless it is something they struggle with. We also wondered why we would feel so awkward asking our supervisors about their gender identity.

We discussed the difference in what the young people were saying compared to what the adults were saying – wondered why this was. We reflected more on our own gender identity

and whether this has been consolidated more throughout the research. The team said I was probably the ‘most feminine’ – I am surprisingly happy about this. I wonder if this comes from interviewing people who extol the virtues of being female.

Analysing the Data

I am happy themes are coming out, but it seems like at this point they don’t really help to answer my research question. I am hoping once I step back and think about them this will all become clearer.

I feel I have now grasped what my themes are suggesting and I am really happy they match with the research out there. Although I am feeling awkward about disseminating the results back to the participants as I feel they may be quite hard to hear.

Write Up

This is the final slog now and I just need to keep going. I actually feel really invested in this project and defensive when people discuss whether people with ASC should transition genders when they actually have no idea what they are talking about.

Table 2. Codes & Themes

Initial Codes	Themes
Not remember	Memories
Play alone	Isolated (no friends/home schooled)
Dinosaurs/tractors	Related to interests
Male toys	Related to interests
Disney	Fictional characters
Princess outfit	Fictional characters
Dressing up made me happy	Fictional
Film	Fictional
Dull colours	Experience of males
Female friends	Relate to females – nicer/more empathic
More connection with females	Experience of females
Girls are nicer	Experience of females
Boys are boisterous	Boys are aggressive/boisterous/sporty
Girls talk to you	Experience of females
Closer to females	Experience of females
Close to mum	Family
Mostly female teachers at school	Experience of females
Male teachers not nice/aggressive	Experience of males (teachers, peers)
Females understood	Experience of females
Females empathic	Experience of females
Don't remember	Thin
All male at school	Exposure to males
Females play with me	Relate to females – nicer/more empathic
Females are easier to speak to	Relate to females – nicer/more empathic
Appearance changed but not person	Identity
Liked female clothes	Female persona (clothes, make-up, hobbies, exciting)
Watching cartoons	Fictional
Love make up	Experience of females
Related to online character	Fictional
Be an individual	Identity
Appearance/feeling	Stereotypes
Girls clothing is exciting	Female persona
Not remembering	Thin
Doesn't know	Thin
Unsure	Internal
Similarity and preferences	Related to females
Objects that defined females	Related to objects
Dressing as a princess	Fictional
Close to parents	Strong relationship
Unsure	internal

Unsure	internal
Liked a character	fictional
Same interests as girls	Related objects
No friends	Isolated
Bullied at school	Isolated
Female because of clothes and make up	Stereotypes
Make up made me feel prettier	Stereotypes
Watched mum put make up on so tried it	Experience of females
Not just females wear make up	Paradoxical
Clothes made me feel happier	Objects
Told friends then teacher than parents	Told people by proxy
Everyone okay with it	Dissonance
Was teased by boys so didn't relate to them	Experience of boys
People thought she should wear make-up everyday	Stereotypes
Related to female celebs	Relational
Male friend was feminine, preferred females	Experience of females
Not known	Memories
Doesn't feel right in head and stomach	Internal
Not telling people	Proxy
Gender identity through clothes	Objects
Stereotypical female interests	Related
Talking more as a female	Internal
Bullied for being gay	Isolated
Females show more emotion	Females in a positive light
Shopping is female	Stereotype
Close to parents	Strong relationship
Relate to females as has same interests	Relational
Gender changes depending on how you feel	Non-binary
Didn't like other children	Isolated
Close to parents	Strong relationship
Hated school	Isolated
Home-schooled	Isolated
Boys behaviour bad; girls behaviour good	Idolised females
Boys genetically boisterous	Experience
Blocked out memory	Memory
No male teachers	Experience
Hated sports	Related to females
Boisterous when younger	Experience
Didn't relate to others	Isolated
Didn't feel right	Internal
Internet influenced gender	Internal
Related to internet female character	Relational
Female gender identity different for everyone	Identity
Calmer now female	Idolised females
Females have to act in a sexualised way	Experience
I am my own person	Identity
Females aren't expected to be clever	Experience
Gender identity is internal	Internal
GD always there but things have brought it to forefront	Internal
Male toys, male clothes	Interests

Only child	Isolated
No friends, bullied	Isolated
Hard to speak to people	Isolated
Close to mum	Strong relationship
Teachers stricter to males	Experience of males
Got on better with females, personality was better	Related to females
Females friendlier	Idolised females
Internet influenced	Social media
Related to people online	Online influence
Used to watch girls shows	Interests
Angry when younger	Aggression
Born into wrong body	Internal
Harder to relate	Related to girls
Disney	Fictional
Princess outfit	Clothes
Cinderella	Fictional
Dressing up	Fictional
More connection with females	Related
Girls are nicer	Experience
Boys are boisterous	Experience
Girls talk to you	Experience
Closer to females	Related
Close to mum	Family
Male teachers are aggressive	Experience
Females understand	Experience
Females are empathetic	Experience
All male school	Experience
Females are easier to speak to	Experience
Liked female objects	Relational
Liked to dress in female clothes	Fictional
I've not changed as a person	Identity
Like female traits	Experience
Related to character	Relational
I am who I am	Identity
Use the internet for research	Online influenced
Being female is about appearance	Stereotypes
Girls clothing is exciting	Idolised females
Angry when younger	Aggression
Close to mum	Strong relationship
Was aggressive	Aggression
Violent	Experience
Wore neutral clothing	Neutral when younger
Played female computer games	Related
Not good at socialising	Isolated
Not good at talking to people	Isolated
Teacher told parents	Proxy
Doesn't abide by expectation	Identity
Friendlier as a female	Experience
Gender identity is internal	Internal
Enjoys videogames	Related

Home-schooled	Isolated
Related to female book characters	Related to fictional characters
Neutral clothes	Neutral when younger
Liked books on females	Fictional related
Not many friends	Isolated
Not friendly person	Experience
Felt like female trying to be male	Internal
Hated people	Isolated
Had long hair, looked feminine	Stereotypes
Disliked rugby	Idolised female
Talked to people online	Fictional
Was an angry hating person	experience
Presented as female online	Online influenced
Online meant you could be who you wanted to be	Fictional
Wears female clothes	Female objects
Can be open socialising	experience
Being emphatic is female	Idolised female
Mother supportive	Strong relationship
Related to non-human characters	Fictional
Girls are expected to put on make up	Female
More thoughtful and aware	Idolised female
Feel non binary	Non binary
Think in a female way	Internal
Close to mum	Family
Interest same as parent	Family
Time with dad	Family
Interests like parents	Family
Fictional play	fictional
Play with girls	experience
Boys made fun	experience
Alone	Isolated
Women at school	experience
Role model women	experience
Idolised woman	experience
Many females at school	experience
Boys bullied	experience
Always with the girls	experience
Feeling	Internal
Bullied	experience
Close to parents	Family
Angry	experience
Confused	Internal
Unsure	Internal
Uncomfortable	Internal
Parents fine	Proxy informing
Trapped	Internal
Confidence	Internal
Comfortable	Internal

Appendix P. Report for Service, Research & Development Team & NHS Ethics Panel

Report for the Service, R&D & NHS REC

An Exploration into Gender Identity Development in the presence of Gender Dysphoria and Autism Spectrum Condition

Objective: The purpose of this study was to explore how gender identity developed in assigned males with a diagnosis of gender dysphoria (GD) and Autism Spectrum Condition ASC. There had been an increase in referrals to the gender XXXX, particularly for people with ASC. It was therefore imperative we researched into this to try and understand this rise, and how gender identity develops in this population.

Research: Eight assigned males, between the ages of 15-18, were interviewed about the development of their gender identity, using a timeline of their life to aid discussion. They also completed two tasks during the interview. One was a social circles task; asking who they were close to. The other was how they felt towards their body. Interviews were analysed using thematic analysis and critical incident technique.

Main Findings: The findings suggested there were several factors that could have impacted on gender identity development in assigned males with ASC and GD. Participants considered their sex and gender to be one and the same; therefore their gender identity was not open to external influences. It also emerged participants struggled to recall memories from their childhood, but ones they did recall, were about relating to the genders through stereotypical gender objects. Findings also suggested participant's previous experience of cismales and females influenced their own gender identity development. Participants spoke of their experience of cisfemales in an idealistic narrative, yet their experience of cismales seemed to describe them with less desirable traits. Participants displayed cognitive rigidity when thinking about gender specific activities, and their experience of cismales and females.

Participants also described experiencing feelings of being uncomfortable, and using different media sources to learn this was attributed to GD.

Implications: It is imperative clinicians remain curious when understanding why someone wishes to transition genders, and with this population certain areas should be explored further. Clinicians should explore the impact of isolation on the young person, and their expectations of how transitioning genders would help with these difficulties. Findings suggested people may wish to transition genders in the hope of alleviating their difficulties with relating to others. Clinicians should also explore young people's internalised rules of how males and females should act, in the hope that they could provide some flexibility in their thinking.

Dissemination: The findings from this study will be presented to the Gender XXXX during their team meeting, and a report will be sent to NHS REC. A report detailing the findings has been sent to all participants who consented to receiving the findings. All participants were asked if they wished to know the outcome of the study at the end of the interviews. The research is proposed to be published in the International Journal of Transgenderism.

For further information please contact l.e.fisher267@canterbury.ac.uk

Appendix Q. Summary Report for Participants



Report for Participants

An Exploration into Gender Identity Development in the presence of Gender

Dysphoria and Autism Spectrum Condition

Introduction

The purpose of this report is to inform participants of the findings of the study they were involved in.

Thank you

I would like to start by taking this opportunity to thank each and every one of you for your time given to be involved in this study. Your contribution has been invaluable in helping to understand gender identity, and how services can be better placed to assist people in exploring their gender.

Objective

The purpose of the study was to explore gender identity development in assigned males with autism spectrum condition. This study has now come to a close, and the findings have been analysed.

Research

I interviewed eight assigned males with gender dysphoria and autism spectrum condition. During the interview, participants also completed a social circles task and a task about how they felt towards their body.

Findings

The research found gender identity was influenced by a multitude of factors. It emerged many participants struggled to recall memories of their childhood, but ones that were recalled were about relating to cisfemales through their interests, and the experience participants had of cismales and females. Participants recalled cisfemales to have more desirable characteristics than cismales. Participants often spoke of their gender as being internal, equated with biological sex, and not open to external influences. Participants also spoke of being isolated when growing up, and of having used the media to understand GD.

Outcomes

The findings from this study will be presented at the Gender XXXX so they can ensure they are best supporting their service users. The findings will also be sent to the International Journal for Transgenderism for publication.

If I have any questions who should I contact?

If you have any questions, then please contact me - l.e.fisher267@canterbury.ac.uk.

If you have any concerns about the study that you feel you cannot discuss with me, please contact Dr Fergal Jones, Research Director, Salomons Centre for Applied Psychology – fergal.jones@canterbury.ac.uk. (03330117070).

Once again, THANK YOU for your participation.

Appendix R. Declaration of the End of the Study



Health Research Authority

DECLARATION OF THE END OF A STUDY

(For all studies except clinical trials of investigational medicinal products)

To be completed in typescript by the Chief Investigator and submitted to the Research Ethics Committee (REC) that gave a favourable opinion of the research within 90 days of the conclusion of the study or within 15 days of early termination.

For questions with Yes/No options please indicate answer in bold type.

1. Details of Chief Investigator

Name:	LAURA FISHER
Address:	Salomons Institute, 1 Meadow Road, Tunbridge Wells, Kent. TN1 2YG
Telephone:	01227 92 7166
Email:	L.E.FISHER267@CANTERBURY.AC.UK
Fax:	

2. Details of study

Full title of study:	Gender Dysphoria and Autism: The Development of Gender Identity
Research sponsor:	Canterbury Christchurch University
Name of REC:	XXXX Ethics Committee
REC reference number:	17/LO/1906

3. Study duration

Date study commenced:	23/04/19
Date study ended:	12/03/19

Did this study terminate prematurely?	<p>No</p> <p><i>If yes, please complete sections 4, 5, 6, & 7.</i></p> <p><i>If no, please go direct to section 8.</i></p>
---------------------------------------	--

4. Recruitment

Number of participants recruited	
Proposed number of participants to be recruited at the start of the study	
If different, please state the reason or this	

5. Circumstances of early termination

What is the justification for this early termination?	
---	--

6. Temporary halt

Is this a temporary halt to the study?	
If yes, what is the justification for temporarily halting the study? When do you expect the study to re-start?	<i>e.g. Safety, difficulties recruiting participants, trial has not commenced, other reasons.</i>

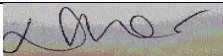
7. Potential implications for research participants

Are there any potential implications for research participants as a result of terminating/halting the study prematurely? Please describe the steps taken to address them.	
--	--

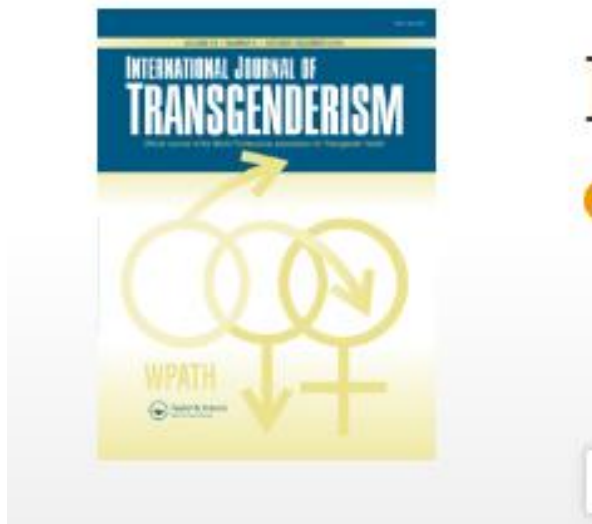
8. Final report on the research

Is a summary of the final report on the research enclosed with this form?	Yes <i>If no, please forward within 12 months of the end of the study.</i>
---	---

9. Declaration

Signature of Chief Investigator:	
Print name:	LAURA FISHER
Date of submission:	14/03/19

Appendix S. Journal for submission's notes for authors



EDITOR

Walter Pierre Bouman, MD,
PhD, *National Centre for
Transgender Health, Nottingham,
UK*

International Journal of Transgenderism, together with its partner organization the World Professional Association for Transgender Health (WPATH), offers an international, multidisciplinary scholarly forum for publication in the field of transgender health in its broadest sense for academics, practitioners, policy makers, and the general population.

The journal welcomes contributions from a range of disciplines, such as:

Endocrinology
Surgery
Obstetrics and Gynaecology
Psychiatry
Psychology
Speech and language therapy
Sexual medicine
Sexology
Family therapy
Public health
Sociology
Counselling
Law
Medical ethics

We publish:
Original research (quantitative as well as qualitative)

Theoretical essays
 Policy statements
 Review articles
 Commentaries
 Letters to the editor

International Journal of Transgenderism has a commitment to an International focus, as reflected in our Editorial Board, whose members are from Europe, the Americas, Australia, and New Zealand. All manuscripts published by *IJT*, including those in special issues, have undergone rigorous, anonymous peer review, and editor screening.

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Thank you for choosing to submit your paper to us. These instructions will ensure we have everything required so your paper can move through peer review, production and publication smoothly. Please take the time to read and follow them as closely as possible, as doing so will ensure your paper matches the journal's requirements. For general guidance on the publication process at Taylor & Francis please visit our [Author Services website](#).

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About the Journal

International Journal of Transgenderism is an international, peer-reviewed journal publishing high-quality, original research. Please see the journal's [Aims & Scope](#) for information about its focus and peer-review policy.

Please note that this journal only publishes manuscripts in English.

International Journal of Transgenderism accepts the following types of article:

Research articles

Review articles

“For debate” Articles

Commentaries and Letters to the Editor

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Preparing Your Paper

Research articles

Should be written with the following elements in the following order: title page; abstract; keywords; main text introduction, materials and methods, results, discussion; acknowledgments; declaration of interest statement; references; appendices (as appropriate); table(s) with caption(s) (on individual pages); figures; figure captions (as a list)

Should contain a structured abstract of 300 words. • Abstracts should be brief, structured and should incorporate the sub-headings: background, aims(s), methods, results and discussion. Abstracts should communicate the primary findings and significance of the research. They should not exceed 300 words in length.

Should contain between 3 and 3 **keywords**. Read [making your article more discoverable](#), including information on choosing a title and search engine optimization. • Title page (first page of article): Each article must have a title page with the title of the article, an Abstract, followed by Key words. • Please list up to 6 keywords which are not included in the title of the article, for the purpose of indexing. • Introduction: Briefly state the relevant background to the study to provide the necessary information and context to enable non-specialists to appreciate the objectives and significance of the article. • Method(s): Materials and procedures should be described in sufficient detail to enable replication. Any statistical procedures used should be outlined and their use should be justified here. Results should not be included in the Method(s) section. If statistical procedures are used, they should be described here in adequate detail. Choice of statistical technique should be justified including some indication of the appropriateness of the data for the technique chosen. Adequacy of the sample size for the statistical technique(s) used must be addressed. If appropriate, a description of the statistical power of the study should be provided. If multiple univariate significant tests are used, probability values (p-values) should be adjusted for multiple comparisons, or alternatively a multivariate test should be considered. • Results: This section may contain subheadings. Authors should avoid mixing discussion with the results. Sample sizes should be delineated clearly for all analyses. Some indicator of variability or sampling error should be incorporated into the reporting of statistical results (e.g. standard deviation, standard error of the mean). Wherever possible an indicator of effect size (e.g. Cohens d, η^2 , Cramers V, 95% confidence interval) should be reported in addition to p values. If multiple

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Should be written with the following elements in the following order: title page; abstract; keywords; main text introduction, materials and methods, results, discussion; acknowledgments; declaration of interest statement; references; appendices (as appropriate); table(s) with caption(s) (on individual pages); figures; figure captions (as a list)

Should contain a structured abstract of 300 words. Abstract should contain the following headings: Background/Aims(s)/methods/Results/Discussion

Should contain between 3 and 5 **keywords**. Read [making your article more discoverable](#), including information on choosing a title and search engine optimization. International Journal of Transgenderism will aim to publish 1 or 2 review articles in each issue. Authors intending to submit a review article should check recent issues of the Journal to ensure that no review of the topic they propose to discuss has been published in the journal in recent times. We encourage authors to adhere to the PRISMA guidelines for systematic reviews (see <http://www.prisma-statement.org>). Review articles may have up to 75 relevant

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Informed consent All individuals have individual rights that are not to be infringed. Individual participants in studies have, for example, the right to decide what happens to the (identifiable) personal data gathered, to what they have said during a study or an interview, as well as to any photograph that was taken. Hence it is important that all participants gave their informed consent in writing prior to inclusion in the study. Identifying details (names, dates of birth, identity numbers and other information) of the participants that were studied should not be published in written descriptions, photographs, and genetic profiles unless the information is essential for scientific purposes and the participant (or parent or guardian if the participant is incapable) gave written informed consent for publication. Complete anonymity is difficult to achieve in some cases, and informed consent should be obtained if there is any doubt. For example, masking the eye region in photographs of participants is inadequate protection of anonymity. If identifying characteristics are altered to protect anonymity, such as in genetic profiles, authors should provide assurance that alterations do not distort scientific meaning. The following statement should be included: Informed consent: “Informed consent was obtained from all individual

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- i) A check list and flow chart in accordance with the CONSORT guidelines which can be found at <http://www.consort-statement.org>. Please send in the checklist as a supplementary file and include the flow chart as Figure 1 in the manuscript.
- ii) The trial protocol is to be submitted as a supplementary file. This will not be published, but it is needed to appraise and peer review the paper.
- iii) The registration number of the trial and the name of the trial registry in which it was registered. Please add these to the last line of the paper’s structured abstract. Trials that began enrolment of patients after 1 January 2009

must be registered in a public trials registry at or before the onset of enrolment to be considered for publication in International Journal of Transgenderism. Trials that began enrolment prior to 31 December 2008 must have been registered no later than that date. Our criteria for a suitable public trial registry are: free to access; searchable; identification of trials by unique number; free or minimal cost for registration; validation of registered information; inclusion of details to identify the trial and the investigator within the registered entry (including the status of the trial); research question; methodology; intervention; and funding and sponsorship disclosed. If the research was paid for by a funding organization, the cover letter must contain the following three statements. If the research was not paid for by a funding organization only the third statement is required: a. That the authors have not entered into an agreement with the funding organization that has limited their ability to complete the research as planned and publish the results. b. That the authors have had full control of all the primary data. c. That the authors are willing to allow the journal to review their data if requested.

References

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This work was supported by the [Funding Agency] under Grant [number xxxx].

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This work was supported by the [Funding Agency #1] under Grant [number xxxx]; [Funding Agency #2] under Grant [number xxxx]; and [Funding Agency #3] under Grant [number xxxx].

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